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## Continuity and Change in a Domestic Industry: Santa María Atzompa, a Pottery Making Town in Oaxaca, Mexico

**Mary Stevenson Thieme**

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**Cover photograph:** A kiln in Santa María Atzompa, Oaxaca, Mexico has just been opened and the pottery glows red hot as it is being unloaded. Photograph by the author in July 1990.


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## Table of Contents


Abstract . . . 1
Preface . . . 1
Materials and Methods . . . 1
Chapter 1: Background and History . . . 3
Oaxaca . . . 3
Valley of Oaxaca . . . 4
Pottery Production in the Valley of Oaxaca . . . 5
Santa María Atzompa and Its Antecedents . . . 6
An Explanation for Longevity . . . 7
The Town Itself . . . 7
Chapter 2: Forms and Styles of Atzompa Pottery . . . 8
Classes of Pottery . . . 8
Domestic Ware . . . 9
Greenware . . . 10
*Artesanías* . . . 10
Continuity and Change . . . 11
Chapter 3: Ceramic Materials . . . 12
The Clays . . . 12
Gritty Clays . . . 12
Alluvial Clays . . . 15
Analysis of Clay Materials . . . 15
Clay Acquisition and Preparation . . . 16
Choices of Clays . . . 18
Materials for Surface Treatment . . . 20
Glaze . . . 20
Other Surface Materials . . . 21
Continuity and Change . . . 22
Chapter 4: The Production Process . . . 22
Forming the Pottery . . . 22
Domestic Ware . . . 22
Greenware . . . 23
*Artesanías* . . . 25
Finishing the Pottery . . . 25
Equipment and Spatial Organization of Work Areas . . . 26
Firing the Pottery . . . 28
The Kiln . . . 28
Firing Practices . . . 31
Continuity and Change . . . 37
Chapter 5: Production and Marketing Strategies . . . 38
The Market System . . . 38
Outlets for Domestic Ware and Greenware . . . 39
The 1950s and 1960s . . . 39
The 1990s . . . 41
Outlets for *Artesanías* . . . 44
The *Mercado de Artesanías* . . . 44
Continuity and Change . . . 44
Chapter 6: Family Dynamics . . . 47
The Household Production Unit (HPU) . . . 47
Division of Labor . . . 47
Selected Household Production Units . . . 49
Greenware Producers . . . 50
Domestic Ware Producers . . . 52
Women-Headed Households . . . 53
Continuity and Change . . . 54
Chapter 7: Innovation and Creativity . . . 55
Innovation . . . 55
Innovation in Materials and Techniques . . . 55
Innovation in Forms and Styles . . . 56
Creativity . . . 57
Continuity and Change . . . 58
Chapter 8: Choice, Continuity, and Change . . . 59
Choice . . . 59
Change . . . 60

The Lead Glaze Issue and the Response of the Potters . . . 60
Chapter 9: Conclusions . . . 62
Community Specialization . . . 62
Continuity and Change . . . 63
Acknowledgments . . . 65
Literature Cited . . . 66

## Appendices

Appendix I: Archaeological Sites with Evidence of Ceramic Production . . . 68
Appendix II: Typology of Monte Albán Pastes and Vessel Forms . . . 70
Color Classes . . . 70
Vessel Forms . . . 71
Appendix III: Instrumental Neutron Activation Analysis . . . 71
Appendix IV: Pre-Hispanic Kilns . . . 72
Appendix V: Residues of Ceramic Production . . . 74
Appendix VI: Brief Description of Ceramic Methods in Three Other Valley Towns . . . 75
Appendix VII: Household Practices of the Sample . . . 76
Appendix VIII: Field Museum of Natural History Collection . . . 78
Appendix IX: Glossary . . . 80

## List of Maps

Figure 1.1. The Valley of Oaxaca . . . 4
Figure 3.1. Clay sources . . . 13
Figure I.1. Clay sources and archaeological sites . . . 69

## List of Figures

Figure 2.1. Pottery produced in the early 1990s . . . 11
Figure 2.2. Kiln load of *Artesanías*, late 1990s . . . 12
Figure 3.2. Hillside slope, white gritty clay mine . . . 14
Figure 3.3. Mining white gritty clay . . . 14
Figure 3.4. *Laguna* clay mine . . . 15
Figure 3.5. Plot showing major structure of the data . . . 16
Figure 3.6. The ethnographer sieving *laguna* clay . . . 18
Figure 3.7. Kneading gritty clay powder into soaked *laguna* clay . . . 19
Figure 3.8. Beating gritty clay . . . 19
Figure 3.9. Sieving black gritty clay . . . 20
Figure 4.1. Forming an olla on a revolving platter . . . 24
Figure 4.2. Forming an olla on a ball-bearing disk . . . 24
Figure 4.3. Forming a large basin . . . 25
Figure 4.4. Forming a vase using the hand-modeling method . . . 26
Figure 4.5. Hand modeling a figurine . . . 27
Figure 4.6. Kick wheel dimensions . . . 27
Figure 4.7. Jacinto Olivera forming jugs on a kick wheel . . . 27
Figure 4.8. Adding appliqué to a figure of the Virgin . . . 28
Figure 4.9. Adding decoration to an *Artesanías* figure . . . 28
Figure 4.10. Incising decoration on a Redware vessel . . . 29
Figure 4.11. Grill with spoked-wheel design . . . 31
Figure 4.12. Kiln dimensions . . . 32
Figure 4.13. Mortaring the bricks of the arch . . . 33
Figure 4.14. Working on the kiln walls . . . 34
Figure 4.15. Preparing the kiln and pottery for firing . . . 35
Figure 4.16. An older man supervises the unloading of a kiln . . . 36
Figure 4.17. Ofelia Aguilar glazing a vase (FMNH 339158) . . . 37
Figure 4.18. Firing large basins . . . 38
Figure 4.19. Glazed miniatures are placed, inverted, on nails in saggers . . . 39
Figure 5.1. A transaction at a stall of Greenware and ollas in the *Mercado de Abastos* . . . 40
Figure 5.2. A potter and a trader finalize a sale of ollas, roped together for transport . . . 41
Figure 5.3. Stall in the *Mercado de Artesanías* in 1996 . . . 45
Figure 6.1. A father and son scrape and burnish ollas . . . 48
Figure 6.2. A child learning to make a casserole . . . 49
Figure 6.3. *Artesanías* figure made by Enadina Vasques Cruz . . . 54
Figure 7.1. Forming miniature animals . . . 57

Figure 8.1. Interrelationships of potters' choices . . . . . 60
Figure III.1. Plot showing chemical basis of group separation . . . . . 72
Figure III.2. Bivariate plot of antimony and arsenic concentrations from four pottery towns in the Valley of Oaxaca . . . . . 73
Figure IV.1. Plan and photograph of grill, feature 5 . . . . . 74

## List of Tables

Table 1.1. Periods and phases . . . . . 5
Table 2.1. Pottery types, early 1990s . . . . . 9
Table 3.1. Clay sources . . . . . 13
Table 3.2. Clay procurement choices . . . . . 16
Table 3.3. Tools for mining and preparing clay . . . . . 17
Table 3.4. Clay choices . . . . . 17
Table 3.5. Clay recipes . . . . . 20
Table 3.6. Glaze procurement choices . . . . . 21
Table 3.7. Glaze prices . . . . . 21
Table 4.1. Some forming times . . . . . 23
Table 4.2. Tools and equipment for pottery production . . . . . 29
Table 4.3. Locations of work areas . . . . . 29
Table 4.4. Some production times . . . . . 30
Table 4.5. Kiln dimensions (cm) . . . . . 32
Table 4.6. Fuel costs . . . . . 34
Table 4.7. Firing times . . . . . 36
Table 4.8. Firing temperatures . . . . . 37
Table 5.1. *Mercado de Abastos* costs . . . . . 42
Table 5.2. Outlets and prices, early 1990s . . . . . 43
Table 5.3. Market outlets—changes in the 1990s . . . . . 46
Table 6.1. Composition of household production units (HPUs) . . . . . 49
Table 6.2 Methods of production used by HPUs in 1992 . . . . . 50
Table 8.1. Production choice strategies . . . . . 59
Table 8.2. Change in pottery classes, 1992–1995 . . . . . 61
Table II.1. Paste typology . . . . . 70
Table V.1. Residues of ceramic production . . . . . 75
Table VII.1. Household Practices of the Sample . . . . . 76
Table VIII.1. Field Museum of Natural History Collection . . . . . 78

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## Abstract

The potters of Santa María Atzompa, a town in the Valley of Oaxaca in southern Mexico, have been making pottery for at least 500 years, and the town has been widely known for its production of green lead-glazed cookware and ornamental pottery. This study, conducted in the 1990s, looks at how Atzompa pottery production changed since studies made in the 1950s and 1960s. Beginning in the mid-1990s, to a large extent as a result of public concern, publicity, and legislation about the lead glaze, the potters changed the style, distribution, and social context of their ceramic production. Also examined was the dynamics of household production and the choices that the potters made. A third element of the study was compositional analysis of the various ceramic materials and pastes used by the potters.

Los alfareros de Santa María Atzompa, un pueblo en el Valle de Oaxaca en el sur de México, han fabricado cerámica desde hace 500 años, y el pueblo ha sido ampliamente reconocido por su producción de utensilios de cocina de cerámica verde vidriada y cerámica ornamental. Este estudio, realizado en la década de 1990, trata de la producción de cerámica de Atzompa y como cambió desde los estudios realizados en los años 1950 y 1960. A mediados de la década 1990, hubo una gran preocupación pública y legislativa acerca del vidriado con plomo, y los alfareros modificaron el estilo, la distribución y el contexto social de su producción de cerámica. También examinamos la dinámica de la producción doméstica y las opciones disponibles a los alfareros. Un tercer enfoque es el análisis de composición de los distintos barros, materiales de desgrasante y pastas utilizados por los alfareros.

## Preface

Pottery has a very long history. It is the product of people's activities throughout that history. By taking the raw materials and the technology available to them, potters produce pottery in the societies and cultures in which they live. If we define technology as "the set of solutions developed by a human group to satisfy its needs as it defines them" and include both equipment (hardware) and knowledge and organization (software) (Rabey, 1989, p. 168), then in studying pottery we must consider not only the qualities of raw materials available and the techniques the potters use but also the social and cultural context in which potters work, why and for whom they produce the ware, and how this has changed over time. Pottery studies have moved from, primarily, consideration and analysis of pottery as material culture and archaeological artifacts to greater focus on examining the social, economic, and cultural contexts in which pottery is made. Stimulated by the work of Matson (1965) and Foster (1955, 1959a, 1959b, 1965, 1967), this resulted in work by archaeologists and ethnologists in the last decades of the 20th century, including but not limited to Arnold (1975, 1985, 2008), Costin (1991, 1998), Deal (1998), Feinman (1982a, 1982b, 1986, 1999), Feinman et al., 1981, Kolb and Lackey (1988), Lackey (1982, 1988), Longacre (1991), Papousek (1981, 1984, 1989), Rice (1987), van der Leeuw (1976, 1991), van der Leeuw and Pritchard (1984), van der Leeuw and Torrence (1989), and Wilk 1989. Their work and approaches informed me as I examined household production in Atzompa.

## Materials and Methods

Prior to the 1990s, Santa María Atzompa, a pottery-producing town in Oaxaca, Mexico, had been the subject of two major ethnographic studies. This made it possible to examine and document, through another study, both the continuity and the changes that had occurred in ceramic production during the intervening 40 years. It seemed, therefore, that an ethnographic restudy could be productive for comparative purposes.

The first study, conducted by Jean Hendry (1957, 1992) in the 1950s, focused on techniques of pottery making, socialization, and aesthetics. She spent eight months in Atzompa in 1955. Since she wished to make comparisons between those who made pottery and those who did not, her sample of 69 included 10 nonpotter households (Hendry, 1992, p. 12). Charlotte Stolmaker (1973, 1976, 1996) conducted the second study, doing her fieldwork from August 1967 to September 1968 and September 1969 to January 1970. She looked at social and economic change and focused on attitudes of progressivism and conservatism. Although pottery production was included in her study, she also looked at farming and

material possessions. Her sample of 80 included 69 potter households, 23 of them active in farming, seven full-time farmers, and four households dependent on wage earning (Stolmaker, 1996, p. 3). Stolmaker (1976) also participated in Beals's (1975) Oaxaca market study as a field and research assistant. Her research included household inventories and records of daily purchases. More recently, in the late 1990s, Ramona Pérez (1997) conducted an ethnographic study in Atzompa in which she focused on gender relations, issues of community identity and power, and the complexity of women's lives.

The foci and research goals of my own study were somewhat different. The first goal was to look at whether and how Atzompa pottery production overall had changed or not changed between the 1950s and the 1990s. A second goal was to examine the dynamics of household production and the choices that the potters make. My third goal was to undertake compositional analysis of the various clays and tempering materials used by the potters, following on the work of Anna Shepard (1967), who examined Atzompa tempering material in the 1960s in connection with her study of the ceramics of Monte Albán.

I went to Oaxaca in 1988 to do research and collecting for an exhibit at the Cumberland Science Museum in Nashville, Tennessee, where I was curator. The research in Atzompa developed out of that project, and the 1991 fieldwork was conducted while on sabbatical from the museum. My introduction to the town occurred in 1989 through a Oaxaca friend of Ronald Spores, a man who had worked many years before with Jacinto Olivera y Juarez, the potter in whose household I would live and visit from time to time over the next seven years. Following a brief introductory visit in 1989, I spent a month in 1990, five months in 1991, two months in 1992, a follow-up month in 1993, brief visits in 1994, and two months in 1995. In 1992, my son, Donald Thieme, a geoarchaeologist, came to Oaxaca to accompany me to the clay mines, map them, and undertake preliminary geological analysis.

In 1989, I contacted Jean Hendry and Charlotte Stolmaker and made arrangements to edit their dissertations for publication in the monograph series Vanderbilt University Publications in Anthropology. Working with these manuscripts and with the authors enabled me to become familiar with the Atzompa of their times. Hendry loaned me field notes and lists of names, and Stolmaker answered specific questions that came up during my research. My connections with Jean Hendry and Charlotte Stolmaker facilitated entrée to some households, and Ofelia Aguilar, Hendry's goddaughter, became one of my best informants and a good friend. Since Stolmaker's research was conducted later, many more people remembered her and told me stories of her time there.

After being introduced to the household of Jacinto Olivera and to Atzompa pottery in 1989, I returned in 1990 to spend a month learning about Atzompa pottery production, meet more potters, and develop plans for further fieldwork. The main fieldwork was conducted from March through July in 1991, during which time I lived with the Olivera family, as I did during two months in the summer of 1992. I became part of the household, attending graduations, fiestas, and the funeral of an infant. In 1992, struck by the changes that were beginning to occur as a result of widespread concern, legislation, and publicity about the lead content of the green glaze, it seemed important to follow the events and the changes that were happening. Thus, I returned for a month in 1993, a brief visit in 1994, and two months in 1995. The last field trip was conducted primarily to videotape the potters and to observe dramatic changes in production. Even in the last years of the decade, when I had moved on to another project, I visited the town when I was in Oaxaca, talked with my informants, and observed further change. It had become a long-term study of transition and change.

As stated above, my interest was in the dynamics of household production and the choices the potters make. Netting (1989, p. 231) defines the household as "a socially recognized domestic group whose members usually share a residence and both organize and carry on a range of production, consumption, inheritance, and reproductive activities whose specific contents varies by society, stage in the life cycle, and economic status." Tax (1953, pp. 11–12) found that in the Maya town of Panajachel, data had to be gathered by household, family group, or neighborhood rather than by individual. Similarly, Monaghan (1995, pp. 35–36) noted in his study of Nuyoo, a Mixtec town in Oaxaca, that while people might have different perspectives, they had a strong collective identity, and household members usually spoke and acted as though a household were a single person. A number of scholars have examined the role of the household as a production unit (Reina & Hill, 1978; Deal, 1998, Feinman, 1999). Also referring to Oaxaca, Beals (1975, pp. 40, 52) identifies the household as the unit of both production and consumption and defines it as the unit of analysis, and Nash (1993, pp. 129, 132), in her restudy of the Maya pottery-producing town of Amatenango, noted that the household as a unit of production had not only persevered but had actually increased in output. More recently, Arnold (2008), in his longitudinal study of social change in the Maya pottery-producing town of Ticul, discusses the continuing importance of household production. Congruent with this approach was my decision to focus on the household as a unit that functions with varying efficiency to produce a marketable product and adapt to conditions of change. This I call the household production unit (HPU), and I define it as an entity whose members share living space, cook and eat together, and participate in the various tasks involved in pottery production and marketing. An Atzompa HPU may be a nuclear or an extended family with an aging parent and/or grown and married sons or daughters living on parental land, sharing some production tasks and equipment. It is a flexible, often multigenerational entity that avails itself of members' skills and can respond and adapt to change in available materials, market forces, and the composition of the unit itself. In Atzompa, the household is the focus of identity, and this includes ownership of pottery production.

My third goal developed during the introductory phase of fieldwork (1989 and 1990) as I became aware of the number of clay sources used by the potters and the complexity of the combinations and recipes that they used. I had begun to investigate techniques of clay analysis following on the work of Shepard (1967), who examined Atzompa tempering material in the 1960s in connection with her study of the ceramics of Monte Albán. While in the field in 1991, I read the article by Arnold et al. (1991) entitled "Compositional Analysis and 'Sources' of Pottery: An Ethnoarcheological Approach." I contacted Ronald Bishop at the Smithsonian about my interest and what I was finding in Atzompa. He put me in touch with Hector Neff and his student J. Michael Elam at the University of Missouri Research Reactor (MURR). The

latter was in Oaxaca at the time and gave me guidance in sample collection. It seemed both interesting and useful to analyze these materials, and I was fortunate that Hector Neff and Michael Glasscock at MURR thought it a valuable project, one that could develop a database for Oaxaca ceramics and prove useful for archaeologists, something that has subsequently occurred (Joyce et al., 2006; Spores and Thieme, in press). During the course of my research, accompanied by the potters, we visited and mapped clay sources and collected samples. From potters' workshops, I collected additional samples of raw clays, pastes, and sherds with known composition and methods of preparation of their component clays. Sixty-three samples of clays, pastes, and sherds of known composition were subjected to instrumental neutron activation analysis at the University of Missouri Research Reactor. My interest in the long-term use of the clay materials grew, and Stephen Kowalewski assisted me in identifying possible ceramic production sites near Atzompa, from the Valley of Oaxaca Settlement Pattern Project, and Marcus Winter located sherds from those sites.

My research methodology involved focused interviews and participant observation, emphasizing production technology and the family dynamics of pottery production. In 1989 and 1990, I focused on a few households, expanding the sample to 45 in 1991. The sample was designed to include HPUs practicing the variety of methods, styles, and materials that the potters utilized; it did not include nonpotting households. I was fortunate that the household in which I was living was in the more traditional and less affluent upper section of the town. This gave me an entrée to households less used to visiting anthropologists and tourists than those in the section, closer to the main road. It was not difficult to add HPUs in that section of town to my sample; had I lived in the lower section, this might have been less easy. Following initial interviews in which I used a questionnaire that asked about household composition and pottery methodology—clays, forming method, type of pottery, decoration, glaze source, firing, marketing strategy, and so on—I visited each household repeatedly over the next months and years, noting variations in reported information, such as firing schedules. I also observed changes, particularly those that were occurring in the mid-1990s. While the potters in one household attempted to teach me to make pottery, it became clear to both of us that I was not going to develop the skill, and they decided that my work was writing.

I collected some pottery for the Cumberland Science Museum, now housed in the museum at Scarritt-Bennett Center in Nashville, Tennessee. However, during the course of fieldwork, many pieces were given to me by the potters, and at times I purchased some as a way of thanking informants. Realizing that the accumulated collection, approximately 150 pieces, represented all the styles and forms being made in the early and mid-1990s, in 2003 I offered it to the Field Museum of Natural History. The major portion was transported to Chicago and accessioned in 2006. Each piece is documented by maker, type, and clay composition (Appendix VIII). References to Field Museum catalog numbers (FMNH) have been included in the text where appropriate. Also included are references to pottery that is part of the collection but has not as yet been transported to Chicago and accessioned (MST numbers).

Library research was done at the Heard Library of Vanderbilt University and the Instituto Welte, Oaxaca. The Bay County Library in Panama City, Florida, responded to interlibrary loan requests during the final writing period.

Beals (1975, pp. 18–19), in his work on peasant marketing, sets out succinctly the knowledge, materials, and skills, including business relationships, that an Atzompa potter must have to be successful. These include knowing the appropriate clays and tempers for vessel types and sizes, motor skills for forming and finishing, access to raw materials, capital or credit to buy them, relationships with suppliers, and ability to meet market standards. These categories were explored in accordance with my goals of examining the changes that occurred during the last 50 years of the 20th century, the dynamics of household production, the choices made by the potters, and compositional analysis of ceramic materials.

## CHAPTER 1: BACKGROUND AND HISTORY

The town of Santa María Atzompa, located in the highland Valley of Oaxaca in the state of Oaxaca in southern Mexico (Fig. 1.1), has been known for many years for its green-glazed utilitarian cookware and ornamental pottery, and more recently for unglazed or partially glazed figures, figurines, and ornamented vessels. This pottery is marketed throughout the state of Oaxaca, in other parts of Mexico, and abroad. In 1990, over 90% of households were engaged in pottery production, a year-round occupation and for many a major source of income. As a town of specialized potters producing primarily for an external market, it is influenced by external social and economic forces and exemplifies what Costin (1991, p. 8) calls community specialization, in which "autonomous individual or household based units [are] aggregated within a single community, producing for regional consumption." Pottery is the product of the makers' social identity, and this for people in Atzompa had long been the green-glazed ware for which they were known and which distinguished them from other communities. How this was changing in the 1990s is one of the topics of this study.

### Oaxaca

The state of Oaxaca is located in the southeastern part of Mexico, bordered by the states of Puebla and Veracruz to the northeast, Chiapas to the east, Guerrero to the west, and the Pacific Ocean to the south. With a surface area of 95,364 $km^2$, it is a region of geographical diversity, with altitudes ranging from sea level to 3000 m. The terrain includes mountains with steep-sided valleys, highland basins with flattish to rolling valleys, coastal plains, and tropical lowlands. The mountain mass consists of old crystalline rock with some overlays of limestone, sandstone, and shale. Travertine, salt, iron ores, chert, and gold are among the mineral resources exploited in the pre-Hispanic period. Rainfall, temperature, and soil types vary considerably between locations in relatively close proximity. Rain falls from April or May through October, fluctuating annually from seasonal norms, and temperature depends more on altitude than season. The irregular terrain creates climatic and soil differences at close distances (West, 1964, p. 136).

People have exploited these diverse microenvironments from the earliest periods, and community specialization developed with trading of goods and the development of

Fig. 1.1. The Valley of Oaxaca.

market systems. Today, some raw materials are processed for subsistence, others are transformed into goods for consumption and resale, and some of these goods are circulated in the marketing system. Regional periodic markets are a cultural feature that extend deep into the pre-Hispanic past. Not only agricultural products but also craft goods, including textiles and pottery, are exchanged through the market system; village specialization developed early and continues to play an important role today (Beals, 1975, p. 9; Cook & Diskin, 1976, p. 9; Whitecotton, 1977, p. 136).

Valley of Oaxaca—The Valley of Oaxaca is a relatively flat upland basin, approximately 700 $km^2$, located in the center of the state at an altitude between 1150 and 1850 m, surrounded by mountains that rise to 3000 m. The rock formations contain gneiss and schist, Cretaceous limestones, and volcanic tuff formations (Smith, 1983, p. 13; Payne, 1994, p. 7). The three arms of the valley are drained by the Atoyac River and its tributary the Rio Salado, coming together near Oaxaca City (Fig. 1.1). The climate is mild, with a mean annual temperature of 20°C, rarely dropping below freezing. Rainfall and soils vary; the fertile soils, gentle grades, and high water table in the floodplain, with potential for irrigation, make the alluvium favorable for agriculture. People have lived in this valley for around 10,000 years, and sometime between 2000 and 1500 BCE, they began to live in villages, grow crops, and make pottery (Blanton et al., 1982) (Table 1.1). The Valley of Oaxaca, with 89 *municipios*, is currently the most densely populated region in the state (West, 1964, pp. 373–374; Whitecotton, 1977, p. 18; Alvarez, 1994, p. 25; Blanton et al., 1999, pp. 31–34).

Two ethnic groups have long been the main inhabitants of the valley. These people, the Zapotecs and Mixtecs, speak related languages that probably diverged from the Otomangean common stock sometime during the fourth millennium BCE (Whitecotton, 1977, p. 13; Flannery & Marcus, 1983, p. xix, 11; Josserand et al., 1984, p. 11). By around 1000 BCE, there were already some indications of social inequality, a precursor of the urban period that would develop during the first millennium BCE (Flannery, 1976; Blanton et al., 1999, p. 34–47). During this time, the Etla arm was the most densely populated part of the valley. Around 500 BCE, people began to

TABLE 1.1. Periods and phases.

| Dates | VOA periods and phases | Mesoamerican periods |
|---|---|---|
| | Colonial Period | Colonial |
| 1521 | Spanish arrive in Oaxaca | |
| 1519 | | Spanish conquest |
| 1500 | | |
| | | Late postclassic |
| | Monte Albán V | |
| 1100 | | |
| | | Early postclassic |
| | Monte Albán IV | |
| 700 | | |
| | Monte Albán IIIB | Late classic |
| 500 | | |
| | Monte Albán IIIA | Early classic |
| 300 | | |
| CE | Monte Albán II | |
| BCE | | Late Formative |
| 100 | | |
| | Monte Albán Late I | |
| 300 | | |
| | Monte Albán Early I | |
| 500 | | |
| | Rosario phase | Middle Formative |
| 700 | | |
| | Guadelupe phase | |
| 900 | | |
| | San José phase | |
| 1100 | | Early Formative |
| 1300 | Tierras Largas phase | |

settle on the hills that would become Monte Albán, perhaps as an administrative center (Blanton, 1983).

Between 100 and 800 CE, Monte Albán became the great urban center of the Zapotec people, with elaborate residences, monuments, and tombs. They developed calendars and what may have been the first writing in Mesoamerica, truly one of the great early Mesoamerican civilizations. Around 800, the city began to decline, and population appears to have decreased. Some Mixtec nobility from the mountains to the west intermarried with some of the valley Zapotec elite, and some Mixtec common people also came into the valley, particularly to Cuilapan and Zaachila. The Mixtecs had a highly stratified society with many small kingdoms linked together by networks of kinship, marriage, and sometimes military conquest. They are known for hand-painted written codices and distinctive artistic styles of pottery and jewelry (Whitecotton, 1977; Marcus & Flannery, 1983, p. 218; Spores, 1984, p. 48).

During the 15th century, the Aztec Empire undertook several military campaigns and extracted tribute from a number of Oaxaca towns, with battles occurring between the Aztecs, Zapotecs, and Mixtecs. In 1521, when the Spanish arrived, the Valley of Oaxaca was a tributary of the Aztec Empire that had a garrison where Oaxaca City is presently located, and many valley place-names reflect this Aztec presence (Whitecotton, 1977; Marcus & Flannery, 1983, p. 222). The arrival of the Spanish brought numerous changes: domestic animals, new crops, language and religion, metal tools and vessels, new crafts and new systems of land tenure. Christian missions were established; some communities moved to new locations, and some villages were congregated into larger settlements with central plazas (Whitecotton, 1977, p. 177). Oaxaca City, known then as *Antequera de Oaxaca*, became a station for overland routes. However, unlike other parts of Mexico, indigenous groups were able to maintain control of much of the land in Oaxaca despite the decrease in population caused by epidemic disease, and this meant that the Spanish were not able to achieve the economic domination that they did elsewhere. An exception was the Catholic Church, which had extensive landholdings, particularly the Dominicans, who became dominant in the area. During the Colonial Period, a mixed or *mestizo* population developed, changing the social composition of the region (Murphy & Stepick, 1991, p. 19). During the political upheavals in the 19th and early 20th centuries, following Mexican independence, the region was somewhat isolated, and the indigenous communities were affected only slowly by changes in other parts of the society. In the 20th century, the Pan American highway connected Oaxaca City both to Mexico City and points south, making Oaxaca more accessible for commerce and tourism, and in 1996 a tollway through the mountains was completed. Although expensive to drive, it provides quicker transit for families of affluent tourists from Mexico City. Oaxaca City became and has remained the primary urban center of the region.

POTTERY PRODUCTION IN THE VALLEY OF OAXACA—By around 1400 BCE, people in the Valley of Oaxaca were making pottery, and some of the clay sources that they were exploiting at that time appear to be still in use today (Joyce et al., 2006). Some potters used piedmont clays, others the alluvial clays from the valley floor (Payne, 1994, p. 8; Joyce et al., 2006). In addition to those potters using the Atzompa clays, pottery was produced in the other arms of the valley, and to some extent this continues to be so. San Bartolo Coyotepec, in the Ocotlan arm of the valley, is known for the production of smudged, reduction-fired, burnished blackware, produced in subterranean kilns. This Zapotec town is located on the Pan American Highway 14 km from Oaxaca City, easily reached by tourists, and it has become an important stop for them. Coyotepec has not been as well studied as Atzompa. The potters are reputed to be less welcoming to researchers than other towns and particularly disinclined to share knowledge and samples of their clays. This was the case in the 1930s (Van de Velde & Van de Velde, 1939, p. 24), and I found it continued to be true in the 1990s when we collected samples for the sourcing project. Thus, the Van de Veldes's 1939 study is particularly valuable (see Appendix VI). Coyotepec was known for its water jars (*cantaros*), graceful vessels used throughout the valley prior to the advent of metal and plastic buckets. Already in 1939, potters were making such tourist items as owls, flutes, and bells, and Rosa and Juventino Nieto were considered to be the finest potters in the Coyotepec. Rosa Nieto was later to become recognized locally, nationally, and internationally for the quality of her pottery (Rouillion, 1952; Poupeney, 1974; Harvey, 1991). While in the early 1950s Rosa and Juventino were actively participating in pottery production (Rouillion, 1952), by the mid-1950s Rosa did little except to demonstrate to admiring tourists, and other potters in the town sometimes resented her fame and popularity (Hendry, 1957, p. 33). Members of Rosa's family have continued to operate her workshop, an important stop for tourists, where they give demonstrations and sell black pottery (Rothstein & Rothstein, 2002, p. 51). During the 1990s, the volume of pottery and number of shops operated by other potters increased, and a market building was constructed in the central plaza. With increased volume, shortcuts have been taken, molds are used, and graphite is sometimes applied to the surface of the pottery to produce a highly polished appearance (FMNH 339218).

The town of Ocotlan de Morelos is located in the same arm of the valley as San Bartolo Coyotepec. Hendry (1992, p. 56) and Foster (1955, p. 24) mention production of unglazed pottery there in the 1950s. In the 1990s, three sisters, Irene, Concepción, and Josefina Aguilar, whose parents and grandparents were potters, created ceramic figures painted in bright colors. Each has her own distinctive style, and each has her own workshop where various members of her extended family assist in the production (Mulryan, 1982, p. 26; Wasserspring, 2000, pp. 21–53; Rothstein & Rothstein, 2002, pp. 50–57).

San Marcos Tlapazola is located in the hills above Tlacolula. It is an isolated Zapotec-speaking town. Women there make red slipped pottery, mainly traditional vessels, using a micaceous clay, firing without kilns on the ground (FMNH 339221–339224). They sell their ware in the Tlacalula and Oaxaca weekly markets. To my knowledge, there have been no published studies of pottery production in this town, although William Payne (1994, p. 12) describes the open firing method practiced there. See Appendix VI for further discussion of these towns.

SANTA MARÍA ATZOMPA AND ITS ANTECEDENTS—Santa María Atzompa is located in the Etla arm of the valley of Oaxaca, 8 km northwest of Oaxaca City and about 5 km north of Monte Albán. The Atzompa archaeological site, lying above the town, is considered to have been a suburb of Monte Albán, first colonized during Monte Albán Period IIIA. Pottery has been produced in the town of Atzompa for at least 400 years and in three or more villages between Atzompa and San Lorenzo Cacaotepec since the Late Formative Period (Kowalewski et al., 1989, p. 94). Ceramic production sites identified archaeologically during the Valley of Oaxaca Settlement Pattern project are located near sources of clays used by the modern potters (Appendix I, fig. I.1). These clays fire to a buff, or *crema*, color, and the San Lorenzo Cacaotepec mines have been deeply worked.

Buff (*crema*) wares were important in all periods at Monte Albán. Shepard (1967: 19), conducting petrographic studies of Monte Albán pottery, examined the white nonplastic inclusions that appear in some pottery found there. She concluded that this feldspathic material, which she called diorite, was similar if not identical to the "gritty clay" mined at a source used by modern Atzompa potters and also suggested that this or a nearby source was used by the potters producing ware at or for Monte Albán. Much of the ordinary domestic ware in every period contained the white inclusions (see Chapter 3 and Appendix II for further discussion of this material). Included are all the buff (*crema*) types and some graywares. Since clays used by modern Atzompa potters also fire to a buff color, Shepard suggested that *cremas* and those graywares with white feldspathic inclusions (*gris cremosa*), which refire to buff, or *crema*, color, may have been produced from clays from the same or comparable geological deposits as those mined by modern Atzompa potters (see Chapter 3 and Appendix III for discussion of the instrumental neutron activation analysis [INAA] conducted as part of this research and Appendix II for discussion of reduction-fired grayware). In a study to source Late Terminal Formative ceramics, *crema* sherd samples from 11 sites were analyzed at the University of Missouri Research Reactor. Samples from nine of these sites correlated well with the Atzompa clay sources and modern pottery (Joyce et al., 2006). In addition, some samples of clay found at Monte Albán were also analyzed with similar results (Neff, 1999).

Above the modern town lies the Atzompa archaeological site (Aguirre, 1986) excavated by Jorge Acosta and surveyed in the 1970s by Richard Blanton (1978, pp. 88–91). Considered to have been an extension of Monte Albán, the site has a long occupational history, but the majority of terraces were occupied primarily during the Late Classic Period, Monte Albán IIIB. In addition to evidence of elite occupation, there was evidence of a marketing-distribution system distinct from other parts of the city. There are also indications of ceramic production, and those potters may have utilized the same sources used in the earlier periods by the village potters living near them. The large number of Late Classic Period kiln wasters on the Atzompa site indicates that considerable ceramic production occurred there and may have been initiated in the Early Classic (Feinman, 1980, pp. 111–112, 1982a, p. 196, 1984, p. 320). Furthermore, from the large number of graywares with white inclusions (*gris cremosa*) in the southern half of the Etla arm, similar in form to those at the Atzompa site, one could conjecture that there was substantial production in the area (Feinman, 1980, p. 276, 1982a, p. 197).

When and how people settled and began to make pottery in the present town of Santa María Atzompa is unclear. According to an Atzompa informant, his ancestors once lived at *La Nopalera*, a Late Formative Monte Albán I site surveyed by Kowalewski (1976, pp. 45–46) and located not far from one of Atzompa's 20th-century clay sources. Although Postclassic production sites have not been located in the vicinity of the modern town, the continued presence of white inclusions in the Postclassic pottery types, described as sandy cream and *gris cremosa* by Kowalewski et al. (1989, app. VI), suggests continued production utilizing the same or nearby clay and temper sources. In addition, Postclassic sherds were noted during the Valley of Oaxaca Survey near the town (Kowalewski, 1976: 540). Too, according to oral tradition among modern Atzompa potters, prior to the introduction of the green glaze in the Colonial Period, their ancestors decorated the natural clay color with red slip. This description is not dissimilar to a sandy cream bowl with red paint, category 5425, described by Kowalewski et al. (1978, p. 837). Red-slipped ornamentation persevered as a minor ware into the 20th century, becoming more frequent in the mid-1990s.

Late 17th- and 18th-century documents belonging to the Atzompa *municipio* refer to litigation over rights to the gritty clay mines in Santa Catarina and to contracts with San Lorenzo Cacaotepec for purchase of clay (Aguilar, n.d.). These documents refer to the use of the mines since a time immemorial, and, as mentioned, there is the oral tradition of pre-Hispanic ceramic production prior to the arrival of the Spanish. According to Atzompa informants, the green glaze characteristic of modern Atzompa pottery was introduced in the Colonial Period, approximately 1650, utilizing by-products of Spanish silver mines. The glaze is composed of lead oxide, copper, and silica. In 1991, several informants reported to me that there was mention of the source of the lead oxide in a book housed in the *municipio*, but that the book was no longer there, and unfortunately I was unable to locate it. Within memory of some potters, men from Atzompa went to Santa María Peñoles in the mountains to the west to obtain glaze material, and abandoned silver mines have been identified in the area (INEGI, 2005). Ten sherds from the Santo Domingo convent in Oaxaca City, excavated in 1994, were analyzed at the University of Missouri Research Reactor Center as part of the Instituto Nacional de Antropología e Historia (INAH) archaeological

project to restore the convent. The clay composition was compared with reference groups of clays from sources in Oaxaca, elsewhere in Mexico, and Spain, including clays and sherds from Atzompa analyzed in 1992 as part of my research. One green-glazed sherd showed a convincing match with the Atzompa group, implying that it originated in the vicinity of Monte Albán, perhaps in the community of Atzompa itself (Neff & Glascock, 1995, 2007, p. 325).

An Explanation for Longevity—Peña (1992, pp. 93–95), in a study of raw material use among potters in Vasanello, Italy, noted that the high quality of Vasanello cookware was attributable to the peculiar properties of the clay obtained from the town's principle clay sources. This, along with certain historical circumstances, eonstraints on local agriculture, and regional demand for craft goods, was a significant factor in the persistence of the pottery industry there. Most if not all of these factors could apply to ceramic production in the Atzompa area. According to Shepard (1963, p. 7), Atzompa pottery, made from "buff-firing clay tempered with ground feldspathie roek, makes a soft porous body that has one great advantage: it withstands the expansion and contraction to which a eooking vessel used on an open fire is subject." In the 1930s, preference for Atzompa cooking vessels was attributed to the need for less fuel (Malinowski & de la Fuente, 1982, p. 104), and Stolmaker (1976, p. 191) thought that the popularity of this cookware was due to the porosity that allowed it to be used over open wood fires.

If we examine the circumstances for the development and eontinuation of pottery production, utilizing the clay sources that have continued to be exploited for so long, we can note that the advantageous access to raw materials was combined with historical circumstances and the structure of the regional demand for craft goods, from the time of the rise of Monte Albán to the arrival of the Spanish and continuing through the 20th century. This can be demonstrated by the distribution of pottery with white feldspathic inclusions in the Valley of Oaxaca and beyond from Formative times to the present. Buff (*crema*) wares were produced during the Formative Period. Ceramic production containing this material continued with *gris cremosa* during the Classic Period and the green-glazed ware introduced in the Colonial Period. In the 1930s, Atzompa was reputed to be the most important center of earthenware production in the region, with its products found in the most remote villages (Malinowski & de la Fuente, 1982, p. 104). Although we cannot presume that there was biological continuity of the population of potters, it can be suggested that knowledge and use of clay sources, production methods, and vessel forms may have been transmitted by potters from earliest times. The innovations and changes in production strategies that began to occur in the mid-1990s could be viewed as simply the most reeent in a long tradition of adaptation by potters to changing social, economic, and technological circumstances.

### The Town Itself

The modern town dates at least to the Early Colonial Period. According to Burgoa (1989, p. 402), Atzompa was a dependency of the Mixtec town Cuilapan in the Postclassic and Early Colonial periods (see also Paddock, 1966, p. 375). Although Foster (1955, p. 23) called it a Zapotec town, Parsons (1936, pp. 61, 569) refers to it as being in the Mixteca. However, Paddock (pers. comm.) thought it likely that both Mixtec and Zapotec speakers could have been moved to the town during the Colonial Period following the Spanish policy of concentrating settlements. In addition, I was told by a middle-aged Atzompa informant in 1991 that some elderly people had still spoken Mixtec and Zapotec in his childhood. By the 1990s, only Spanish was spoken.

Hendry (1992) described Atzompa in the 1950s as a large village of over 1600 inhabitants, with unpaved and often gullied streets. Water, abundant except at the end of the dry season, came from wells. Most houses had thick adobe walls, some plastered or whitewashed, with the house plot surrounded by a fence of organ cactus. The town is built on a hillside downslope from the Atzompa site, and this contributes to street erosion. Hendry described two sections, a large and a small ward (*barrios grande* and *chico*), with streets laid out on a grid, although this broke down in the upper area of the town. A stream runs through the small ward, where there is a deep well that never runs dry. In the late 1960s, Stolmaker (1996, p. 7) called Atzompa a village of more than 2000 inhabitants. By 1990, the census indicated a population of 3345, with 622 households, of which over 90% were involved to some degree in pottery production. Atzompa is the head town (*cabacero*) of a *municipio* that includes eight surrounding hamlets with a total population in 1990 of 5781 (Instituto Nacional de Estadistica Geografia e Informática, 1990, pp. 244, 509). The population had more than doubled during the 40 years following Hendry's study, and with the increase in population, the town expanded into previously uninhabited areas, primarily in the common lands to the east and on the hillsides to the south.

**Transportation**—In the 1950s, there was regular bus service five times a day to and from Oaxaca City, but the route was not simple, and it was necessary for the bus to ford the Atoyac River to reach the town. In the rainy season, it could not do this, and travelers had to walk to San Jacinto and cross the often swiftly flowing river to board the bus on the other side. At the height of the rains, the river could not be crossed safely, and the journey took three or four hours by foot or burro through the hills to a bridge on the south side of the city (Hendry, 1992, pp. 17, 19). By the late 1960s, there were improvements in the route; a new road had been built, connecting to an unpaved spur of the Monte Albán highway. This road was first used in 1965, greatly reducing the difficulties of rainy season travel (Stolmaker, 1996, p. 13). By 1990, there was bus service to Oaxaca every half hour. Communal taxis ran regularly between the town and Oaxaca City for those who preferred to pay the higher fare they charged rather than wait for the bus. In 1992, a new paved road to Monte Albán was opened, crossing a new bridge and connecting directly with the Pan American Highway. This enabled the buses to avoid a stretch of unpaved road that sometimes flooded.

The improvement in transportation routes and the resulting increased ease of travel between Oaxaca City and Atzompa were important factors in the changes in the town. It became possible for people to travel back and forth with ease, and Atzompa become a suburb of Oaxaca City. In 1955, Hendry (1992, p. 24) knew six families with relatives working in Oaxaca; they returned to Atzompa only for weekends and holidays. In the 1990s, the buses going into Oaxaca City in the early morning and returning in late afternoon were filled with adults going to work and young people going to school. By 1995, with the increasing numbers of taxis going back and

forth, one needed to wait only a few minutes for a communal taxi or a bus to come along. Many people traveled to the city regularly to shop, for medical treatment, and to visit friends, *compadres*, and family members as well as to sell pottery and buy glaze.

**Other Changes**—Within the town itself, there were also physical changes over time. In the 1950s, there were no paved roads. By 1990, the bus route had been paved, as in 1992 were the streets adjacent to the church. In 1995, the town hired a road grader to widen the main dirt road above the central plaza to make it possible for cars and trucks to pass each other. Electricity became available in 1970 (Stolmaker, 1996, p. 89), and by the early 1990s, most households had been connected; streets and houses were lighted at night. This changed the work patterns of the potters, making it possible for them to work indoors and continue production after dark.

The accumulation of electrical goods is one of the choices people have for their disposable income. Electrical appliances proliferated, the most common being radios, television sets, and blenders. Stolmaker (1996, pp. 90–93), in a list of "non-traditional desired possessions of 78 households," included such items as radios, beds, bicycles, cement floors, and stoves. By the 1990s, many of those objects had been acquired by most households, and most owned television sets. A 1990s list of desired and attained innovations would have included electric or propane gas stoves, refrigerators, stereos, color television sets, video recorders, trucks, and automobiles. Although many people in the southern hillside area still got water from the wells, new pipes continued to be laid, making piped water increasingly available to those who chose to connect.

In the 1990s, the town itself had a different appearance. No longer did one see the cane and thatched-roof houses (*jacales*) reported by Hendry (1992, p. 32) and Stolmaker (1996, p. 9). In the center of town, many older adobe houses with tile roofs remained, although they had often received an outer coating of stucco and had acquired cement floors. Many people continued to prefer adobe, but some families were putting up houses of cinder block or brick. Increasingly, people were building two-story houses and houses with glazed windows. New ones went up each year. In 1991, an adobe building, *La Casa de los Artesanos* (The House of Artisans), ornamented with handsome brick arches, was built on the main street entering the town. This institution is discussed further in Chapter 5.

Many householders imitated that style in new houses and in porches and gateways. Local entrepreneurs sold cinder block, and there was a welding shop. Corrugated metal (called *lamina*) had replaced cane as an inexpensive building material for new dwellings and for outbuildings such as kitchens, pottery workshops, and storage sheds, although cane continued to be used for some of these. An innovation related to pottery production was the use of wood for roofing, fences, and sheds. These edifices were built from the trimmings or "slabs" from lumber mills, the 2.5-m lengths that were purchased by the truckload as fuel for pottery kilns. The constructions were relatively temporary since the wood was burned or sold as needs arose and before the wood could be destroyed by insects.

Each year, new shops opened, selling staples, soft drinks, and so on and, by the mid-1990s, often pottery as well. These shops were located in people's houses or in sheds on house lots near or attached to dwellings. Increasing numbers of household production units (HPUs) put up signs advertising their pottery and maintained small inventories on-site for direct sales. This was a change from Hendry's (1992, p. 89) reports that little pottery was sold in the town in the 1950s.

Public buildings also had changed. In the 1960s, the town built new municipal buildings adjacent to the school. In 1994, a second story, in the arched brick style, and a kiosk in the plaza were added. The colonial church, renovated and reroofed between 1945 and 1954, was repainted in 1992. A town loudspeaker system announced meetings and other special events to the entire community. Stolmaker (1996, p. 9) described the construction of a new school, in process in 1969. Completed, it was a source of pride and community involvement in the 1990s. The old building had become a special secondary school for television technicians and drew students from outside Atzompa. A secondary school in the nearby town of San Lorenzo Cacaotepec had existed since the early 1980s, and many Atzompa children traveled to it daily on bicycles or by foot.

As noted above, much changed in Atzompa between the 1950s and 1990s. The population had roughly doubled, and with this increase people had moved onto land on the south and east of the town. Improved transportation and paved roads meant more frequent travel in and out of Oaxaca City. With electricity came appliances, radios and television, and modified work patterns; a change in building materials led to a different appearance. Changes in pottery production are examined in the following chapters. However, despite these changes, much persevered in this town and among these people, whose tradition has been the production of pottery for hundreds and perhaps thousands of years. In the final decade of the 20th century, one could see highly persistent continuity of traditions and practices along with evidence of change. The options and choices available to families and individuals had increased, and people in the town had chosen to take advantage of both technological and economic opportunities available to them. With flexibility and initiative, Atzompa potters have been able to survive and even prosper in an ever changing environment and to continue to produce and market pottery.

## CHAPTER 2: THE FORMS AND STYLES OF ATZOMPA POTTERY

### Classes of Pottery

For the purpose of the present study, I have divided 1990s Atzompa pottery into three main classes: Domestic ware, fully glazed decorative Greenware, and *Artesanías* (nonfunctional decorative ware). Production methods for all classes include the rotating disk (*moldé*), hand modeling, the kick wheel, and molds. Surfaces are enhanced by incising and appliqué, and color is added by slips and glazes and, in later years, by enamel paint. This chapter presents descriptions of the three classes of ware and their components, with some comparisons to those described by Hendry (1992) and Stolmaker (1996) for earlier periods.

Each potter had his or her own particular form or vessel type first learned (*oficio*), although women sometimes changed their *oficios* at marriage, adopting that of the marital household (Hendry, 1992, p. 100). However, having his or her own particular *oficio* did not limit the options for individual potters or HPUs to expand their repertoires by learning new *oficio*s or classes of ware as opportunities arose.

TABLE 2.1. Pottery types, early 1990s.

| Pottery type | Size range in cm | Finish |
|---|---|---|
| Domestic | | |
| Olla | 64 high × 44.5 diam.–3 high × 2.5 diam. | glazed interior |
| Casserole | 12–25 high × 8–40 diam. | glazed interior |
| Jug | 14–44 high × 17–140 diam. | glazed interior, upper outside |
| Basin | 36 high × 95 diam. rim, 55 diam. base | glazed interior |
| Griddle | 28–82 diam. | unglazed |
| Greenware | | appliqué, incised, fully glazed |
| Jar and jug | see above | fully glazed |
| Casserole | see above | fully glazed |
| Mug | 5.5–10 high × 7.5–19 diam. | fully glazed |
| Teapot | 20 × 15 × 23 | fully glazed |
| Carafe | 25 high × 15 diam. | fully glazed |
| Ashtray | 10–13 diam. | fully glazed |
| Napkin holder | 9 high × 9 long × 5 wide | fully glazed |
| Candlestick | 9–16.5 high × 6.5–13 diam. | fully glazed |
| Vase | 11.5–36 high × 3–20 diam. | fully glazed |
| Salsa dish | 8–10 diam. | fully glazed |
| Salt dish | 5–7 diam. | fully glazed |
| Salt cellar | 9.5 high × 7.5 diam. | fully glazed |
| Miniature animal | 3.5–7 high | fully glazed |
| Miniature vessel | 1–6 diam. | fully glazed |
| *Artesanías* | | |
| Figurine | various: 4–100 high | unglazed, appliqué, red-slipped accents |
| Vessel | see above | multicolor glazes, red slip |
| Flowerpot | widely varied | multicolor glazes, red slip |
| Cross | 8–40 high | appliqué, red-slipped accents |
| Pendant | 4–6 diam. | appliqué, red-slipped accents |
| Nativity scene | 9–15 high | unglazed |
| Candelabra | 27–30 high | appliqué, red-slipped accents |
| Wall hanging | various, 10–20 high | unglazed, appliqué, slip accents |
| Animal musician | various | unglazed or reduction fired |
| Redware | | |
| Covered jar | 18–27 high × 23–28 diam. | red slip, incised floral designs |
| Carafe with cups | 23–25 high | red slip |

As is shown here and in subsequent chapters, this occurred more frequently in the 1990s than it had in the 1950s, when Hendry (1992, p. 61) reported that 91 of a sample of 124 potters from 59 families made only one type of ware.

In the 1950s, most Atzompa potters glazed their ware with lead-based green glaze. Decoration was incised, stamped, or appliquéd, and pottery was not painted. Hendry (1992, pp. 49–53) divided Atzompa pottery of that time into two classes: Domestic pottery (i.e., pottery for everyday use) and Specialties or ornamental ware. Most of the Domestic pottery was glazed on the inside, the outside being left fully or partially without glaze, showing the natural clay eolor; this ranged from buff to red, depending on the clay. Pottery in her Specialties category was produced in smaller quantities than Domestic pottery but in a greater variety of shapes. Ineluded was fully glazed Greenware: vases and flowerpots, jugs for chocolate, coffeepots, sugar bowls, decanters with trays and six small cups, and three-legged incense burners. Other Specialties were slipped Redware, figurines of animals playing musical instruments (*musicos*), and *chias* (animal figures with glazed heads and unglazed striated bodies). These were filled with water during the Easter season and the bodies rubbed with *chía* seeds (*Salvia hispanica L.* [Martinez, 1979]), which gave them their names. When the seeds sprouted, the animal would be covered with a fuzzy green coat and placed on the family altar during Holy Week (Stolmaker, 1996, p. 25). By the 1990s, these figures had become a popular tourist items.

Described here and listed in Table 2.1 are the classes and types of pottery made in the 1990s.

DOMESTIC WARE—My Domestic ware class conforms approximately to that of Hendry (1992, pp. 49–52) and to her descriptions and drawings of the basic shapes: olla, casserole dish (*cazuela*), basin (*apaxtle*), jug (*jarro*), and griddle (*comal*) (Hendry, 1992, pp. 50–51). Hendry (1992, p. 117) also describes variations of these forms. Many Domestic ware forms have a long tradition; they appear to have been made continuously since the Formative Period, and it is notable how similar many are to the forms described by Caso et al. (1967) (see Appendix II). The modern Atzompa forms are made in a range of sizes for general everyday use, primarily as cookware. The inside surface of the cookware and of large ollas for water storage are glazed to prevent leakage. Since Atzompa clays are known for their heat tolerance and conductivity, the exterior of cookware is left fully or partially unglazed to better conduct heat. The quality of this cookware has perhaps made these vessels a popular and preferred choice of cooks of all classes and periods, and Hendry (1992, p. 49) observed that in the 1950s Atzompa Domestic pottery was standard equipment in virtually every kitchen in the valley, with a wide distribution throughout the state of Oaxaca. In the early 1990s, ollas, casserole dishes, and jugs were being produced in greater numbers and sizes than in the 1950s, while other forms, such as the tall, narrow jars (*barrillos*), had diminished in quantity or frequency compared to Hendry's period of study.

**Olla**—The traditional olla is an olla with a rounded bottom. It dates from at least the Formative Period (Flannery & Marcus, 1994, frontispiece A&B) and continues to be important and popular in modern times. In the 1990s, most of those produced in Atzompa were made on a rotating disk, but some kick-wheel users made the smaller sizes. Several sizes are roughly standardized according to function:

> Large, used for water storage—64 cm high × 44.5 cm in diameter
> Medium holding an *almud* of maize—27 cm high × 31 cm in diameter (MST 118)
> Small holding an *almud* of beans—18 cm high × 25 cm in diameter (FMNH 339194)

(The term *almud* is used both as a measure of volume and as a basis of land measurement, i.e., the amount of land that can be sown with an *almud* of seed [Beals, 1975, pp. 78–79].)

Yet smaller ollas are made and sold for such purposes as the preparation of herbal medicines. Sizes vary but include 13 cm high × 15 cm in diameter and 6.4 cm high × 7.6 cm in diameter (FMNH 339193, 339194, 339195). Those with a handle over the top (*ollas de asa*) are used to take lunch to farmers in the fields or filled with food for guests to carry home from fiestas (FMNH 339154). Traditionally, ollas were made with a rounded bottom and, supported by three stones, set over a wood fire. However, some with a flat base and small handles on each side are designed to be set on a gas stove (*ollas estufas*) (FMNH 339196, 339197). The quality of Atzompa clays enabled these ollas to withstand the heat of both wood fires and gas stoves. Another variation is an olla perforated with many small holes (*pichancha*, FMNH 329210); these are used in the processing of maize for tortillas and also by makers of pottery miniatures who place their ware in these vessels during the first firing (see Chapter 4).

Long the preferred cookware for beans and soups in Oaxaca, ollas were produced in substantial quantities in the early 1990s, and hundreds could be seen each Saturday at the pottery market in Oaxaca City. They were sold in small and large quantities both to individual housewives and to traders from throughout the region. An exception to this volume was the large olla; these were produced by only one HPU during my study period. Nevertheless, most Atzompa households had at least one large olla to hold its drinking water, and I observed them being used to prepare the traditional maize drink (*atole*) for a Christmas event in 1995.

**Cazuela**—The casserole dish is a common and frequently preferred type of Domestic ware in many Mexican kitchens. These bowls range from large sizes for cooking to small ones for serving salsa. Diameters range from 40 cm to 8 cm (FMNH 339165, 339166, 339188–339192). This was a change from Hendry's report (1992, p. 53) of little variation in size from the 23-cm-diameter average. In the 1990s, small ones containing salsa could be seen in many Oaxaca City restaurants, usually fully glazed. Most had scalloped rims, and the makers would vary the design. One variation is a shallow dish (*sartén*) described by Hendry (1992, p. 49).

**Jarro**—The jug has a deep neck and high flaring handle; it is a commonly used item in Oaxaca kitchens and restaurants for preparing and serving the hot chocolate drink. Jugs are both half glazed (MST 49) and fully glazed (FMNH 339146), and some of the latter are elaborately ornamented with appliquéd decoration. The larger sizes, circumference circa 140 cm and height 44 cm (49 cm with the handle), were made on a revolving disk. Smaller ones, circa 17 cm in diameter × 14 cm high (19 cm with the handle), were also made by some of the potters who used kick wheels (FMNH 339146).

**Apaxtle**—The basin or out-leaning bowl is also an ancient form, dating at least to the Formative Period (Caso et al., 1967, Lam.VIII; Flannery & Marcus, 1994, frontispiece A). Basins were reported in a range of sizes by Hendry (1992, p. 49), but in the 1990s one saw few of the small sizes finished as half-glazed Domestic ware. However, in the late 1990s, some were ornamented as *Artesanías*. There were two makers of large basins in my sample. These vessels, measuring circa 95 cm in diameter at the rim, 55 cm diameter at the base, and 36 cm in height, were made on a rotating disk. Most HPUs had one or more large basins in their work areas for soaking clay.

**Macetas**—Flowerpots were described by Hendry (1992, p. 49) as similar to basins but taller. In the 1990s, flowerpots came in many forms and sizes; some were round and glazed green on the outside (FMNH 339216), large ollas were left unglazed and provided with a drain hole in the bottom (FMNH 339215), and others were incised, ornamented with appliqué or red slip, and painted as *Artesanías* (MST 136). Hemispherical flowerpots (*jardineros*) were made to hang against a flat surface (FMNH 339217).

**Comales**—Unglazed griddles for baking tortillas are produced in several sizes, ranging from 28 cm to 82 cm in diameter (FMNH 339211). Household production units that specialize in making griddles were not observed to make any other ware. Production costs are low. The potters use local clays, free to Atzompa residents, and since the griddles are not glazed, only one firing is necessary. Production is primarily for local and regional markets.

**Barrillos**—Tall, narrow jars were rarely made in the 1990s, except as *Artesanías* (MST 101).

GREENWARE—My class of fully glazed Greenware, which Hendry (1992, pp. 49, 54–55) includes in her Specialties class, includes both some traditional forms and modern ones: plates, mugs, cups, teapots and coffeepots, decanters, ashtrays, napkin holders, candlesticks, vases, salsa dishes, salt dishes, toothpick holders, and a full range of miniature vessels known as toys (*juguetes*) (FMNH 339203–339205). The latter range in size from 1 cm to 6 cm. Bowls with combed bases (*molcajetes*) are mortars for preparing food; some with the head of a pig are called "*chimoleras*" (FMNH 339176). A small proportion of the total volume of Greenware is made up of Domestic ware vessel forms glazed on both the outer and the inner surfaces, mainly ollas, jugs, and small casserole dishes (see Appendix VIII for additional FMNH pieces, Greenware catalog numbers, and descriptions).

The group photo in Figure 2.1 illustrates the pottery made in the 1990s. On the right is a group of Domestic ware vessels; in the rear is an olla (MST 118), and in the front are a basin (MST 33), a bowl, an olla with a handle (FMNH 339154), casseroles (FMNH 339190, 339191), a jug (FMNH 339146), and a combed base bowl (FMNH 339176). In the front left is a variety of Greenware, including vases (FMNH 339158; MST 55), a candlestick (FMNH 339156), a teapot (FMNH 339169), and a toothpick holder (FMNH 339170). Behind them, a jar with red-slipped appliquéd ornamentation (MST 116) and a figure of a woman (MST 30) exemplify the *Artesanías* of the early 1990s. Next to the figure is an incised Redware lidded jar (FMNH 339206).

*ARTESANÍAS*—The *Artesanía* class, developed during the last half of the 20th century, is purely decorative. The class includes figurines of animals and humans, both religious and

FIG. 2.1. Pottery produced in the early 1990s.

secular, and traditional vessel forms ornamented with cutwork designs, appliqué, flowers, or human faces. Flowerpots of various sizes, wall hangings, and pendants are also made. Some of this ware is left completely unglazed or bisque; other pieces have ornamentation painted onto them with colored glazes or slips (Fig. 2.1). Figure 2.2, a kiln load of *Artesanías* from the late 1990s, illustrates the later styles. Similar are FMNH 339200 and MST 101, 128, and 129. Whereas Hendry included this purely decorative ware in her Specialties class along with Greenware (Hendry, 1992, pp. 53–55), the increase in variety and volume and the differential marketing of this ware led me to place this pottery in a separate class, as did the Atzompa potters themselves.

Much of the credit for the creativity and initiative that led to the development of this class has been attributed to Teodora Blanco, whose work achieved great popularity and international recognition in the 1950s and 1960s. Her talent and creativity have been amply described elsewhere (Mulryan, 1982; Hendry, 1992, p. 117; Stolmaker, 1996, p. 30). In the 1950s, she was making small figurines of people and of animals playing musical instruments (Hendry, 1992, pp. 53, 117). By the late 1960s, her work included large unglazed human figures ornamented with appliquéd designs of birds, fish, and flowers (Stolmaker, 1996, p. 30). Following her death in 1980, this style continued to spread through the town. Further discussion of creativity, innovation, and its diffusion is given in Chapter 7.

In the 1990s, in addition to the use of red slip on flowerpots and as decorative accents on *Artesanías*, there was a distinctive slipped, polished Redware with incised designs, usually floral (Fig. 2.1) (FMNH 339206, 339207). This burnished, incised Redware was reported to me as being a relatively recent technique, diffusing then through the second generation of an extended family. Vessel forms were mainly lidded jars in several sizes and carafes with handleless cups. Although Hendry (1992, p. 49) describes some use of red slip on both utilitarian and decorative objects by a few families, this does not appear to be the highly polished Redware with incised decoration that was being produced in the 1990s.

**Continuity and Change**

A shift in the proportion of Domestic ware to Greenware occurred in the years between the 1950s and the early 1990s. The growth in production and sale of Greenware and the proliferation of forms during the 40 years between Hendry's study and the early 1990s was stimulated by the increasing market for this ornamental ware from buyers in Mexico and abroad. Writing in the late 1960s, Stolmaker (1996, pp. 29–30) commented on the increasing market for decorative ware and attributed it in part to the opening of the Pan American Highway and the increasing tourist market. This created a demand for the miniature pots, decorated ashtrays, and figurines (Stolmaker, 1976, p. 192, 1996, p. 30). By the 1990s, the ability to satisfy this demand was facilitated by both the availability of prepared glaze and the growth in number of kick-wheel users able to produce pottery rapidly. Both factors changed the way in which male labor was utilized, as is discussed further in later chapters. In the early 1990s, the total volume of Greenware (i.e., fully glazed traditional and modern forms and miniatures) equaled in volume that of the Domestic ware class and, if one counted the numbers of individual miniatures, exceeded it. Some changes also appeared in Domestic ware itself (e.g., flat-bottomed ollas for use on stoves and greater variety in the sizes of casserole dishes). Other forms became less common (e.g., tall jars, large ollas, and small basins). Congruently, potters were making *chías* for the tourist market, and there was some increase in the production of *Artesanías*. In addition to the forms that had been made since the 1950s, such as *chías*, banks, and various

FIG. 2.2. Kiln load of *Artesanías*, late 1990s.

animal forms, in the early 1990s a few potters were making large unglazed human figures, some ornamented with appliqué or red slip.

By 1993, potters were expressing concern about decreasing sales of lead-glazed Domestic cookware and Greenware, not only to individual local and tourist customers in local and regional markets but, more important, also to dealers whose bulk purchases were the more critical to their livelihood. As a result, more potters were trying alternatives, leaving their pottery unglazed or beginning to experiment with glazes other than green. This trend continued and is discussed further in Chapter 8.

In response to market forces, potters made choices to shift toward increased production of *Artesanías*, an option in the palette of choices available to HPUs since mid-century. By the mid-1990s, increasing numbers of potters were adding it to their repertoire. The number and variety of forms and styles made by Atzompa potters in the early 1990s was an important factor in their capacity to shift their production and adapt to changing circumstances as the decade progressed.

## CHAPTER 3: CERAMIC MATERIALS

In this chapter, we look at the materials used by the potters; the clays, glazes, and slips; and their sources and composition. Traditionally, men were responsible for the procurement of the clays and glaze materials used in the production of Atzompa pottery. While the basic pottery materials had changed little from Hendry's (1992, pp. 64–66, 71) and Stolmaker's (1996, pp. 21–22) descriptions (see also Flannery & Marcus, 1994, p. 22), some new ceramic materials had been introduced, and there was decreased availability of others.

### The Clays

Clays used by Atzompa potters are mined from five or more sources, prepared and combined in varying recipes, based on defined criteria of vessel type, size, and finish. The potters mix clays of different compositional characteristics to achieve specific results for practical, aesthetic, and economic reasons. To make pottery, clay must be plastic enough to form a pot, but the clay body must contain enough nonplastic material for the vessel not to collapse. Some nonplastic material may occur naturally in the clay, but if it is insufficient, the potter will add more. These additions are what archaeologists call temper (Rice, 1987, pp. 406–413; Arnold, 2008, p. 191).

We investigated the raw materials, their sources, methods of preparation, and the choices and uses of the materials by the potters. Accompanied by them, we visited and mapped the clay sources (Fig. 3.1; Table 3.1) and collected samples. From potters' workshops, we collected additional samples of raw clays, pastes, and sherds of known composition. Sixty-nine samples of these materials were subjected to INAA at the University of Missouri Research Reactor (Appendix III).

There are two classes of clays. The first consists of smooth alluvial clays that are soaked in water. These are called by the potters "clays-to-soak." The second group consists of coarse gritty materials known as gritty clays (*barros ásperos*) or clays-to-beat; the nonplastic inclusions present in them function as temper. The soaked clays also contain some nonplastic inclusions, and one should note that the potters call both groups "clay" (*barro*). The gritty clays are beaten, then sieved to form powder that is kneaded into the moist, soaked clays. In general, potters use coarser powder and greater proportions of it when they are making larger vessels.

GRITTY CLAYS—White gritty clay is the most widely used of these materials, mined about 3.8 km west-southwest of

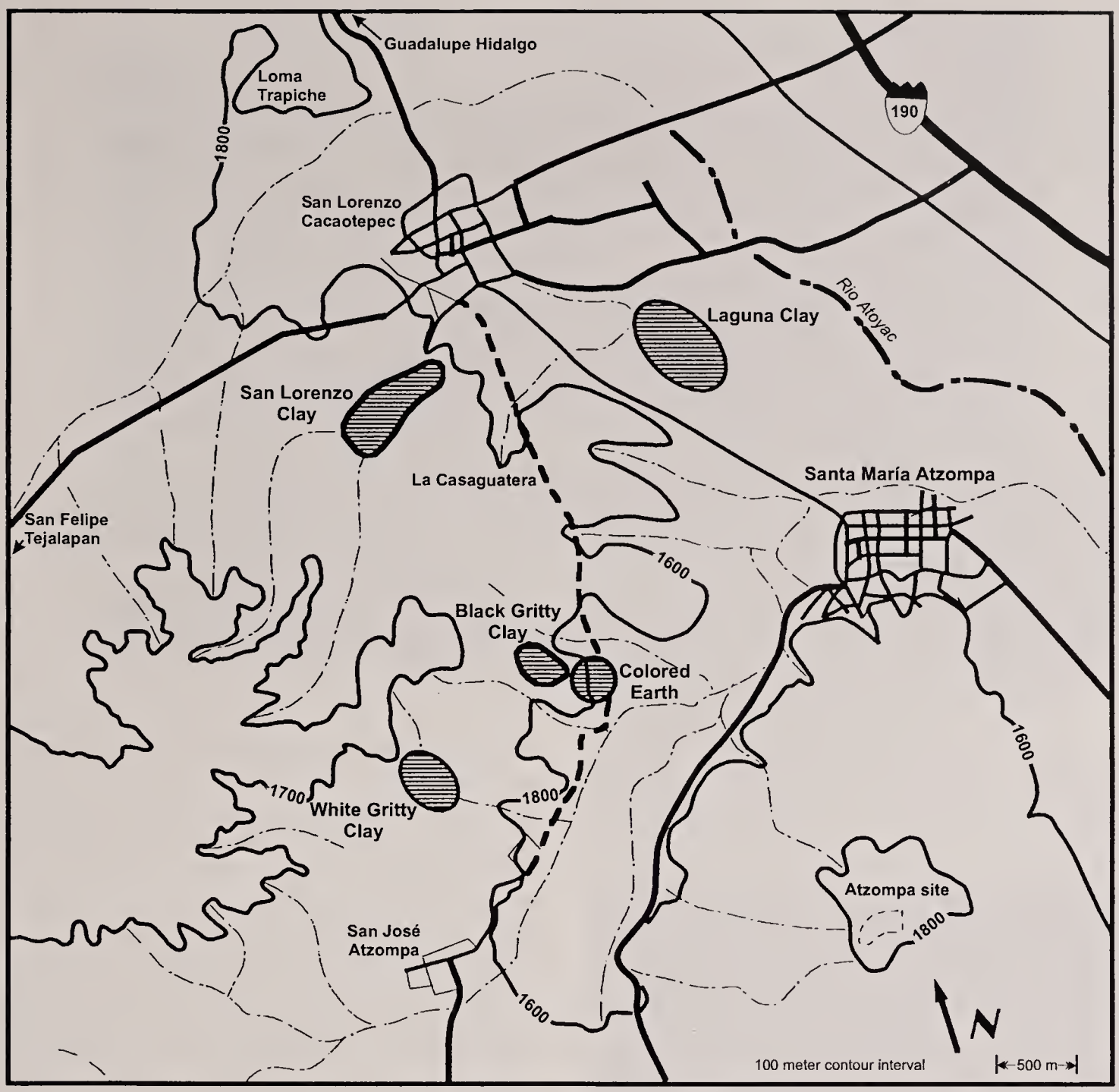


FIG. 3.1. Clay sources.

Atzompa, northwest of Santa Catarina Atzompa, a hamlet of the Atzompa *municipio* (Figs. 3.2, 3.3). Donald Thieme, an archaeological geologist, accompanied me to this source in 1992 and subsequently examined the material (Thieme et al., 2000). The source, which extends over an area of approximately 25 ha, is a hillside slope that shows evidence of extensive utilization. The potters mine clay beds and overlying deposits of rock and clay that appear to result from a large debris flow, probably in response to an earthquake. As discussed in Chapter 1, Anna Shepard, looking for a source of the white inclusions observed in ceramics at Monte Albán, conducted mineralogical analysis on this material in the 1960s.

TABLE 3.1. Clay sources.

| Source | UTM coordinates | Area (ha) | Distance from SMA (km) |
|---|---|---|---|
| San Lorenzo | E 733,000/N 1893,500 | 40 | 3.8 |
| Laguna | E 735,000/N 1893,500 | 60 | 2 |
| San Felipe | E 735,000/N 1893,500 | | 10 |
| White gritty | E 733,000/N 1891,000 | 25 | 3.8 |
| Black gritty | E 734,000/N 1891,800 | 15 | 2.2 |
| Colored earth | E 734,300/N 1891,600 | 15 | 1.8 |

She concluded that it was not produced solely by surface weathering (i.e., is not "primary" clay) and suggested that the feldspathic crystals she identified resulted from alteration of igneous rock in the last stages of cooling and consolidation. She also suggested that the material was "altered rock that had been destroyed by earth movement" (Shepard, 1967, p. 478).

Monte Albán is located on a ridge in a Lower Cretaceous erosion remnant. Within this ridge, there are igneous dikes and a core of Precambrian basement. Donald Thieme is of the opinion that the clay beds and overlying deposits of rock and clay result from a large debris flow, probably a result of an earthquake, and he noted at least one dike of igneous rock far upslope of the source. This would represent the deuteric alteration that Anna Shepard noted in the feldspathic crystals. The actual clay beds represent a flow of debris off the upper hillslope in which large dikes of the parent material were separated and reworked into small fragments that eventually weathered to the individual crystals in the clay. The basement complex is mapped as gneiss (INEGI, 1984), but neither the outcrop upslope of the Santa Catarina source nor the material in the mine contains any dark minerals or visible banding characteristic of gneiss. The clasts which the Atzompa potters are mining appear to be almost entirely plagioclase feldspar,

FIG. 3.2. Hillside slope, white gritty clay mine.

and the parent rock should therefore be classified as an anorthosite. The altered clasts can be seen with the naked eye as white specks in both the modern Atzompa pottery and sherds of the pre-Hispanic pottery from Monte Albán and other sites. Feldspar clasts in the Atzompa pottery are unique and easily recognized when examined in thin sections under a petrographic microscope using polarized light. The feldspars have long thin grooves or "twinning" striations that result from growing in contact with one another. They also have spots of bright pink, green, or blue "birefringence" that result from parts of the feldspar changing to minerals such as epidote and mica. These brightly colored spots can be seen only when the feldspars are examined by passing polarized light through a thin section of the pottery. As first suggested by Anna Shepard, these petrographic characteristics may be a fingerprint for the source and paste recipe used in this portion of the Valley of Oaxaca (Thieme et al., 2000).

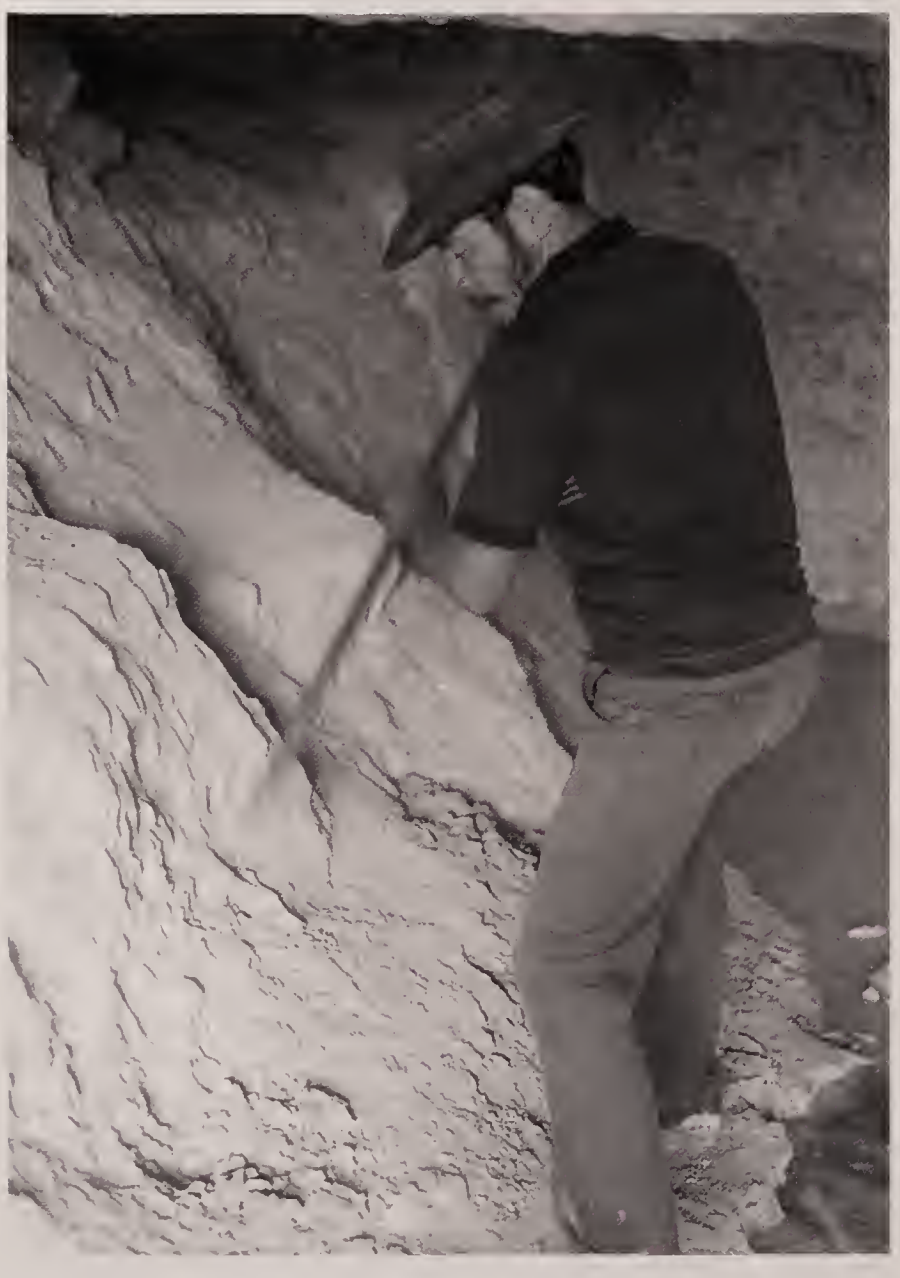

FIG. 3.3. Mining white gritty clay.

The ridge system in which this temper mine is located is in fact the geologic source for all of the ceramic materials traditionally used by Atzompa potters. The diverse materials derived from the nearby stream valleys and their adjoining slopes define a single compositional continuum according to the chemical analyses reported by Hector Neff as part of this study, Appendix III, (Thieme & Neff, 1993; Joyce et al., 2006, pp. 585–596).

Black gritty clay (*barro áspero negro*) comes from a slope about 1 km northeast of the source of the white gritty material; approximately 15 ha in area, it lies in what appears to be a high alluvium. This gray or black earth, high in humic material, is used primarily but not exclusively by those HPUs using the kick wheel, and some potters report that it makes the pottery stronger and less liable to break during transport. However, INAA of the black gritty clays showed close chemical similarity to the white gritty clay, consistent with their derivation from the same parent material; the different appearance is a probable indication of a different weathering history (Neff, 1993b). The inclusions in the fired ware appear white, probably because the humic material burns out on firing. Included in the area are sources of a reddish gritty material used by some makers of large ollas and jugs, and 300 to 400 m from it is a source of similar material used by makers of large basins.

Alluvial Clays—The clays-to-soak came from three sources in the early 1990s. San Lorenzo Cacaotepec, located about 4 km northwest of Atzompa, is a town that does not itself produce pottery. As mentioned above, documents belonging to Atzompa describe 18th-century contracts with San Lorenzo for purchase of clay; they provide evidence that the clays have been used for at least 200 years (Aguilar, n. d.). The area of exploitation extends over approximately 40 ha around the town, and there are indications of present and past mining activities in several widely separated areas. One source is a seam along a stream southwest of the town with several collapsed pits, evidence of long-term exploitation. At the juncture of two creeks, there was a pit no more than 5 m across where the miners had dug 1.5 m and reported that they would need to get to 3 m to reach the clay. We observed both a gray seam and a black seam. The gray clay, from closer to the surface, was said by potters to dry more rapidly. The black clay, from a deeper level, dries more slowly. Potters reported no preference or any difference between the two clays in working or in the final results. Perhaps the difference in color is simply the presence of more organic material in the darker clay. The gray to blaek San Lorenzo clay is smooth, with few inclusions, and fires to a buff color.

The *laguna*, the second source of clay-to-soak, is located in the Atzompa *municipio*, 2 km northeast of the town, an area that had been used for at least 40 years. A black, buff-firing clay, it has been mined over a fairly extensive, 60-ha alluvial area that is regularly flooded seasonally (Fig. 3.4). Hendry (1992, p. 64) describes a clay source she called "*barro de Crespo*" as located near an open quarry in the Atzompa *municipio*. It was considered to be inferior and full of stones that had to be picked out. Stolmaker (1996: 22) locates *Crespo* on her map as near the *laguna* source. In the 1990s, most potters took *laguna* clay from 40 to 120 cm below the surface, although those who made griddles took theirs from 15 to 40 cm. The mines belong to the town of Atzompa, and the clay is available at no cost to residents.

San Felipe Tejalapan, approximately 10 km west of Atzompa, is the third source of alluvial clay. According to Hendry (1992, p. 64), in the 1950s most makers of cookware used this clay, with some making the trip with burros, others purchasing it from Atzompa men who transported it as their business. Stolmaker (1996, p. 22) also included this source on her map of clay sources, indicating its use in the late 1960s. However, by the 1990s, only a few HPUs and only one in my sample were still using it. The mine was reported to be deep and dangerous and inaccessible in the rainy season. The reported depth indicated that it had probably been worked for a long time, but when I visited the area in 1995, I saw only abandoned pits. Preparation of San Felipe clay was similar to San Lorenzo. Gray in color, it fires to a warm, slightly reddish color, and its unavailability had had an interesting result. Most makers of half-glazed cookware were using *laguna* clay but reported that their customers did not like the buff color, so they were adding to the paste a colored earth from a 15-ha site near the black gritty clay mine. This addition resulted in a fired color closer to that of San Felipe clay. Potters reported that the addition made the vessels break more quickly, "but that is what the customers want."

Analysis of Clay Materials—Sixty-nine samples of clays and sherds with known composition were submitted for compositional analysis at the University of Missouri Research Reactor by Michael J. Glascock and Hector Neff in 1992. This was done with the goal of determining whether compositional subdivisions based on clay sources could be recognized in the Atzompa pottery and raw materials. Included were samples of the three alluvial clays, (*laguna*, San Lorenzo, and San Felipe), the gritty clays, the colored earth, prepared clays consisting of the variety of mixtures or recipes used by the potters, and fired sherds representing the clays, mixtures, and vessel types in the Atzompa universe of pottery. In addition to the pottery materials, clays used in kiln construction, red slip, and 22 samples of raw materials and fired sherds from three other pottery-producing towns in the Valley of Oaxaca, San Bartolo Coyotepec, San Marcus Tlapazola, and Ocotlan de Morelos were analyzed for comparative purposes (see Appendix VI for a brief discussion of pottery production in these towns).

Hector Neff (1992) conducted the analysis much as he would have done if the data set were archaeological (i.e., as if the source of the materials was unknown). The results of the analysis, shown in Figure 3.5, indicated that the *laguna* and San Lorenzo clay sources each forms a distinct compositional group within the larger Atzompa continuum (see Appendix III). Gritty clays are distinct from soaked clays, and the two main clay sources, *laguna* and San Lorenzo, are distinct from each other. For the San Lorenzo–derived analyses, clays and pottery fall into a single compositional group, while analyses of *laguna* pottery indicate that it is a mixture of *laguna* clay and gritty clay. The chemical distinctions we expected to find, based on raw material and procurement location, are indeed present in the Atzompa data.

Fig. 3.4. *Laguna* clay mine.

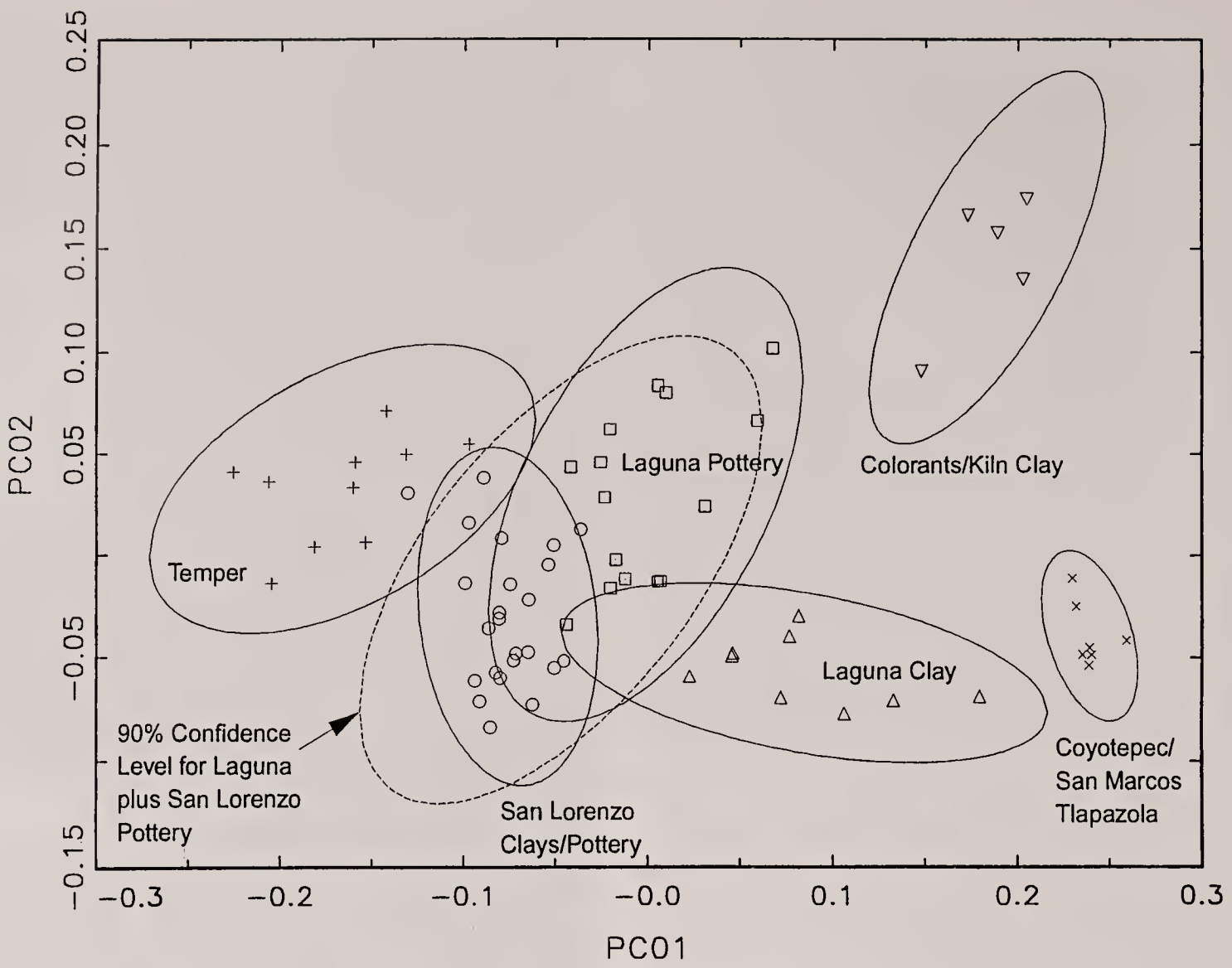


FIG. 3.5. Plot showing the major structure of the data.

It is also possible to step back and look at the Atzompa ceramic raw materials as representing a single "source." Geologically, the "source" of clays and pottery is the ridge system in which the white gritty clay mine is located. The few San Felipe analyses are generally consistent with the other Atzompa pottery, logical since the San Felipe source probably consists of clays weathered from the same ridge. The mineralogical and textural variation that Atzompa potters recognize and use to classify and identify their raw materials reflects differing weathering histories of material ultimately derived from the same parent rocks. Although far from chemically uniform, the diverse materials derived from this alluvial system define a single compositional continuum. The INAA further described in Appendix III shows that Atzompa potters use a variety of plastic and nonplastic ceramic materials that are all ultimately derived from the Cretaceous deposits of the Monte Albán ridge and the underlying igneous structures. The alluvial and gritty clays represent different stages of decomposition of these parent materials (Neff, 1992; Thieme & Neff, 1993; Thieme, 2001; Joyce et al., 2006).

CLAY ACQUISITION AND PREPARATION—A round-trip to the *laguna* mine for one burro load takes about 2 hours, to the white gritty clay mine in Santa Catarina about 2.5 hours, to the black gritty clay mines about 1.5 hours, and to San Lorenzo about 4 hours. As shown in Table 3.1, all clay sources except San Felipe Tejalapan fall within the 5-km radius that Arnold (1975, p. 192, 1985, pp. 32–35) posits as preferred by potters. As suggested above, it is probable that the utilization of the Atzompa clays has considerable time depth, and it is possible that San Felipe clays were used by some of the ancestors of present potters who may have relocated from that area to Atzompa during the Colonial Period.

Table 3.2 lists the varied strategies for procurement of clays. In this table and subsequent ones and in Appendix VIII, the clays have been given the following codes for simplification: C1 San Lorenzo, C2 *laguna*, C3 San Felipe, T1 white gritty, T2 black gritty, T3 colored earth added by potters to provide color for partially glazed vessels, T4 reddish gritty material used with large ollas and jugs for color, and T5 gritty material for large basins. Table 3.3 lists the tools and equipment that the potters use in mining and preparing clay.

In most households using *laguna* clay (C2), the men or boys dug it themselves. In contrast, most potters using San Lorenzo clay (C1) purchased it from San Lorenzo Cacaotepec or from Atzompa men who mined it there for resale. Of the 29 HPUs using white gritty clay (T1), 19 sent men or boys to Santa Catarina to dig the material, and 10 purchased it from resellers either by burro load or by truckload. Among those who purchased their materials were four HPUs in which men were

TABLE 3.2. Clay procurement choices.

| Source | Dig | Buy | Total |
|---|---|---|---|
| San Lorenzo (C1) | 5 | 22 | 27 |
| Laguna (C2) | 19 | 2 | 21 |
| San Felipe (C3) | | 1 | 1 |
| White gritty (T1) | 19 | 10 | 29 |
| Black gritty (T2) | 11 | 2 | 13 |

TABLE 3.3. Tools for mining and preparing clay.

| Tool | Function |
|---|---|
| Mining clay | |
| Crowbar | dig clay |
| Metal spade | dig clay |
| Wooden digging stick | dig clay |
| Folded mat | carry clay |
| Clay preparation | |
| Wooden beater | beat |
| Tin washtub | hold clay |
| Tin and plastic pails | hold clay and water |
| Ceramic bowl or basin | soak clay |

either not present or not participant. In three of these households, *laguna* clay was purchased, and four bought their white gritty clay. Also purchasing gritty clays were some HPUs in which men participated in the forming of pottery and the HPU that used San Felipe clay. Most makers of miniatures or small *Artesanías* did not use gritty clay. Some HPUs used more than one soaked or gritty clay, and most of them were making more than one type of pottery, using whichever clay was appropriate for that type (Table 3.4), and, as noted above, some users of black gritty clay believed that its addition made their pottery stronger and better able to travel.

Preparation of San Lorenzo clay is accomplished by letting the clay dry thoroughly and then soaking it in water for at least 1 to 2.5 hours, although some HPUs reported soaking it longer. It could be soaked for several days if other tasks intervened. The clay is then set out to dry in patties roughly 45 cm in diameter. The appearance of cracks indicates that it is ready to knead (Hendry, 1992, p. 66). San Lorenzo clay was rarely sieved in the early 1990s. The few stones were picked out by hand during kneading. However, in 1995, several HPUs were observed to be sieving their clay after soaking it. These potters reported that an increase in the number of stones in the clay they were buying necessitated sieving. Since San Lorenzo clay sources have been mined for hundreds of years and the volume extracted increased in the latter half of the 20th century, it is possible that the availability of quality clay is diminishing.

TABLE 3.4. Clay choices.

| Clay | Dig/buy | Type of ware |
|---|---|---|
| C1 | dig | *Artesanías*, figures, Domestic flowerpots |
| C1 | buy | *Artesanías*, miniatures |
| C1 | buy | *Artesanías* |
| C1 | buy | *Artesanías* |
| C1 | buy | *Artesanías*, Greenware |
| C1 | buy | Greenware miniatures (kick wheel) |
| C1 | buy | Greenware miniatures |
| C1 | buy | Greenware miniatures (kick wheel) |
| C1 | dig | Greenware vessels |
| C1 T1 | buy C1, dig T1 | *Artesanías* |
| C1 T1 | buy | *Artesanías* |
| C1 T1 | buy | *Artesanías* |
| C1 T1 | buy | *Artesanías*, replicas |
| C1 T1 | buy C1, dig T1 | *Artesanías*, flowerpots |
| C1 T1 | buy | Domestic casseroles |
| C1 T1 | buy | green ashtrays etc. |
| C1 T1 | buy | green vessels |
| C1 T1 | buy | Greenware |
| C1 T1 | dig | Greenware |
| C1 T1 | dig | Redware |
| C1 T1 T2 | buy | *Artesanías* |
| C1 T1 T2 | buy C1, dig T1 T2 | Greenware (kick wheel) |
| C1 T2 | buy C1, dig T2 | Greenware |
| C1 C2 T1 | dig C2 T1, buy C1 | Domestic vessels, Greenware miniatures |
| C1 C2 T1 T2 | buy | *Artesanías*, Domestic, Greenware |
| C1 C2 T1 T4 | buy C1, dig C2 T1, T4 | Domestic large globular jars |
| C1 C2 T1 T5 | dig | Domestic large basins, flower pots |
| C2 T1 | dig | Redware |
| C2 T2 | dig | Greenware vessels (kick wheel) |
| C2 T1 | dig | Domestic casseroles, flowerpots |
| C2 T1 | dig | Domestic griddles |
| C2 T1 | dig | Domestic ollas |
| C2 T1 | dig | Domestic ollas |
| C2 T1 | buy | Domestic vessels |
| C2 T1 | dig | green vessels |
| C2 T1 T2 | dig | Greenware casseroles (kick wheel) |
| C2 T1 T2 | dig | Greenware, Domestic casseroles |
| C2 T1 T2 T3 | dig | Domestic ollas, jugs, flowerpots |
| C2 T1 T3 | dig | Domestic casseroles |
| C2 T1 T3 | dig | Domestic ollas, bowls, etc. |
| C2 T2 | dig | Domestic casseroles. |
| C2 T2 | dig | Domestic casseroles, jars |
| C2 T2 | dig | Domestic griddles |
| C2 T2 | dig | Domestic jugs |
| C3 T1 | buy | Domestic large basins |

FIG. 3.6. The ethnographer sieving *laguna* clay.

*Laguna* clays contain more extraneous material than those from San Lorenzo and require more preparation, including levigation. Clay is left in a shaded area for several days. When partially dry, it is put to soak in water for as long as a week, then sieved to remove coarse material (Fig. 3.6) This is accomplished by putting the wet clay into a sieve and shaking it over a second basin. The clay is not pressed through the sieve, and clay that does not pass through is put back to soak longer. Grit and stones are tossed aside, resulting in a pile near the preparation area. Finally, the sieved clay is put to soak for an additional day in a second basin, then kneaded with powdered gritty clay to prepare the clay body (Fig. 3.7).

Gritty clays are prepared by spreading the raw material in the patio area to dry, hastening the process by shuffling through it with their feet when partially dry, thus exposing the undersurfaces to the sun's rays. When rain threatens, the clay is quickly shoveled into buckets or baskets and put under cover until the rains pass; these are among the first tasks performed by children. When the clay is thoroughly dry, it is beaten with a beater made from a bent tree root (Fig. 3.8). The beaters are purchased in a range of sizes, generally related to the size of the user. After the lumps of clay have been broken up by beating, the material is shaken through a sieve to form powder (Fig. 3.9). In the past, sieves were made of twigs, and Stolmaker (1996, p. 25) reports the utilization of metal screening as a technical innovation in the late 1960s, although Hendry (1992, p. 66) also reports use of metal screening. By the 1990s, plastic had become the more commonly used material. For example, plastic mesh, derived from worn-out shopping bags in common use in the markets, would be attached to a wooden frame to form a sieve. The size of mesh selected was related to the degree of fineness required by the potter for the type and size of ware to be produced; bigger mesh and coarser powder were used by makers of griddles, large ollas, and basins, and smaller mesh and finer powder were used by those making small vessels or throwing on a kick wheel. Any material that did not pass through the sieve is discarded and the residue eventually swept up and piled outside the immediate work area (see Appendix V for residues of ceramic production).

CHOICES OF CLAYS—The potters are discriminating in their use of clays, with attention to selection for specific purposes. They combine clays according to generally acknowledged recipes, based on experience and tradition but also with flexibility to particular circumstances; this is analogous to the compounding procurement strategy in the typology proposed by Bishop et al. (1982, pp. 317–318), whereby desirable properties are obtained by mixing clays from distinct resources. Most of the potters working on the revolving platter combined one of the soaked clays with the gritty white powder, using approximately the same proportion of powder by volume, with somewhat higher proportions being used for larger vessels (Table 3.5). This is likely to reduce thermal shock in these larger, thicker vessels (Rice, 1987, pp. 229, 366). One maker of large, ornamented ollas used two parts white powder to one part soaked clay. Makers of unglazed griddles used similar proportions, forming their vessels on a bed of wood ash, selecting clay from the upper levels of the *laguna* mine. Makers of the large basins combined the soaked clay of choice with a gritty black material used only for large basins, saying that this makes the vessels stronger.

**1950s**—At that time, Atzompa potters used either San Felipe or San Lorenzo clays. While a few potters considered them equal and used whatever was available, most had preferences, saying that San Lorenzo was considered to result in clearer green when glazed but was too soft for large pieces and that San Felipe resulted in a muddy green when glazed but that its red color made it more popular for the half-glazed Domestic pottery (Hendry, 1992, p. 64). Although San Felipe clay was no longer readily available in the early 1990s, it was still used by one maker of large basins. Another HPU, however, used San Lorenzo clay for its large basins and *laguna* clay for flowerpots. Potters in the only HPU still making large ollas mixed equal proportions of *laguna* and San Lorenzo

FIG. 3.7. Kneading gritty clay powder into soaked *laguna* clay.

clays and kneaded in both black and white gritty clays to form the clay body.

**1990s**—As shown in Table 3.4, most makers of fully glazed Greenware chose clay from San Lorenzo. Depending on the type and size of ware, they would use pure San Lorenzo clay or mix it with one of the gritty clays. They said that San Lorenzo gave a better color green than *laguna*, and the rate of firing breakage was also reported to be lower for pottery made

FIG. 3.8. Beating gritty clay.

FIG. 3.9. Sieving black gritty clay.

with San Lorenzo clay than that made with *laguna* clay, perhaps because San Lorenzo has fewer inclusions. Potters using San Lorenzo clay usually invested more time in the production of each vessel than those who used *laguna*; thus, it was a cost-effective choice for them to take more care in production to avoid firing damage. Makers of miniatures and *Artesanías* used pure San Lorenzo clay, virtually without exception. *Laguna* clay, being less pure, was considered to be unsuitable for small objects, and this was true whether production was by hand or kick wheel.

Those who used kick wheels to make Greenware vessels varied in their strategies. Some chose to focus on large volume, rapid production, and low cost. Those potters used *laguna* and black gritty clays. Others chose to purchase San Lorenzo clay in order to decrease breakage and achieve a preferred color. Except for those who made miniatures, they usually mixed it with the white gritty powder. This seemed to be an area of individual experimentation or preference. Finally, the craftsmen who produce *Artesanías* all chose San Lorenzo clay, and if they used gritty clay, they chose the white powder. Proportions varied according to the size of the pottery.

### Materials for Surface Treatment

GLAZE—The Atzompa green glaze, the most common surface treatment, was introduced during the Early Colonial Period, approximately 1650 CE, utilizing by-products of Spanish silver mines as described above. It is composed of lead oxide, which the potters call *greta* (copper and silica); the lead serves as a flux for low temperature firing in the wood-burning kilns, and the copper provides the green color.

Prior to the late 1960s, most HPUs ground and mixed the glaze materials in stone glaze mills. These mills consist of stone basins and two stones attached to a vertical axle; the stones are rotated by means of an attached horizontal bar propelled either by manpower or by a burro, an arduous and time-consuming task (Hendry, 1992, pp. 71–72). The source of the basalt stone for the mills lies along the stream leading to the black gritty clay mine. Several informants described the procurement, sources of materials, and methods of preparation of the glaze prior to the availability of commercial glaze materials. Silica-bearing quartz rock was obtained from San Felipe Tejalapan, sometimes in exchange for pottery, and, as mentioned in Chapter 1, some potters remembered when Atzompa men went to Santa Maria Peñoles in the mountains to the west for other glaze materials. The quartz- and copper-bearing rocks were roasted in the kiln before grinding, to make them softer. According to Hendry (1992, p. 71), in the 1950s the lead oxide and copper sulfate were purchased in Oaxaca City; the silica, from a white crystalline rock that could be picked up in Atzompa, was crushed with a stone hammer and added to the copper and lead oxide. She gives the proportions as 1 kg lead oxide, 85 g copper, and 1 kg rock.

By the late 1960s, Atzompa potters could purchase their glaze fully prepared and premixed with copper oxide and water from four local stores and a Oaxaca City retailer who got his materials from the Monterrey region. In 1967, the retailer was offering glaze premixed, and by 1968, most potters were buying the premixed glaze, and only a minority of men continued to grind their own (Beals, 1975, p. 310; Stolmaker, 1976, p. 193, 1996, pp. 21, 25). By the 1990s, the glaze mills were no longer used to grind glaze materials. However, some HPUs that had them continued to employ the mills to mix the glaze; they preferred to buy the raw materials and mix the

TABLE 3.5. Clay recipes.

| Class | Method | Type | Clays | Mixture |
|---|---|---|---|---|
| Domestic | revolving platter | ollas, bowls | C2 T1 T3 | equal C2T1, 10% T3 |
| Domestic | revolving platter | griddles | C2 T1 | equal |
| Domestic | revolving platter | large ollas | C1 C2 T1 T2 | equal parts all |
| Green | kick wheel | vessels | C2 T2 | equal |
| Green | kick wheel | miniatures | C1 | |
| Green | kick wheel | mugs, ollas | C1 T1 T2 | C1 + equal parts T1 T2 |
| *Artesanías* | revolving platter, hand | vessels, figures | C1 C2 T1 | varies by size |
| *Artesanías* | hand | figurines | C1 T1 | appliqué pure C1 |
| *Artesanía* | hand | small figures | C1 | |

TABLE 3.6. Glaze procurement choices.

| Source | No. HPUs |
|---|---|
| Co-op | 24 |
| Oaxaca store | 9 |
| Other | 3 |
| Not using | 9 |

TABLE 3.7. Glaze prices.

| Year | Co-op | Store |
|---|---|---|
| 1987 | 2000 MXP | 1600 MXP |
| 1990–1991 | 8000 MXP | 4000 MXP |
| 1993 | 10 MXN | 6–6.5 MXN |

glaze themselves, claiming that they got a better product this way.

In the 1990s, the glaze components came from commercial sources in northern Mexico, primarily Monterrey and Guanajuato. The *greta* was identified by Pamela Vandiver of the Smithsonian Conservation Analytical Laboratory (pers. comm., 1995) as pure lead oxide. Michael Boylen, professor of ceramics at Marlboro College in Marlboro, Vermont (pers. comm., 1995), further defined it as a litharge or white lead oxide. See also Foster (1948, pp. 90–92).

Retail sources were the Oaxaca City store described by Stolmaker (1976, p. 193, 1996, p. 25) and a glaze cooperative in the town. The glaze cost less at the store, but purchasing it was less convenient, and some potters reported the quality to be inferior, saying that it contained less copper (Table 3.6). However, the Oaxaca City vendor was willing to extend credit, whereas the cooperative required cash. Also, a few HPUs kept a stock of glaze on hand for resale to others.

The glaze cooperative was started in 1984 with a $1,200,000 MXP loan from the town government that had been repaid by 1991. In 1984, there were 24 individual members, of whom 20 participated actively in the work of purchasing materials and preparing the glaze. With one exception, all the members were men from potter households. This is consistent with the customary practice in which men were in charge of glazing (see Chapter 6 for discussion of division of labor). The exception was Ofelia Aguilar, the youngest daughter of the potter family with whom Hendry lived in the 1950s; she is Hendry's goddaughter. Her HPU consisted of herself and her elderly mother, who died in December 1991. From a prominent family, she is a strong and independent woman.

Located one street away from the plaza, the public buildings, and the church, the cooperative consisted of a building where raw materials were stored, sales were conducted and accounts kept, and a patio area with a glaze mill was used for mixing the materials. Records were kept of each sale and each purchase of materials, a responsibility usually handled by Ofelia Aguilar. The lead oxide, copper oxide, and silica were purchased in 100-kg bags from Guanajuato or Monterrey. In 1991, the cost per metric ton was $20,000 MXP for the copper, $5000 MXP for the lead oxide, and $2000 MXP for the silica. Two kinds of liquid glaze were prepared and sold. Yellow (*amarillo*), used for Domestic ware vessels, was said to contain less copper and was a paler green than the green (*verde*) glaze sold to makers of Greenware. In 1991, six vats of glaze, 25 kg each, were prepared each week by a member of the cooperative.

Proportions were reported to be 4 kg of lead oxide to 1200 g silica and 200 g copper oxide. First, water was added to the copper oxide and the solution stirred for about 15 minutes. Then silica was added and stirred for another 15 minutes. Finally, the lead oxide was introduced and the mixture blended for 30 to 45 minutes. The mixing thus took nearly an hour, and there was talk of buying an electric motor to reduce the labor of preparation by cooperative members. Since water was added at each stage and the amount left to the discretion of the man doing the mixing, it is possible that this resulted in inconsistencies in the concentration of the suspended glaze material. Some buyers reported feeling that they were "buying water," and, as mentioned, some customers with access to glaze mills bought the raw materials from the cooperative and prepared the glaze themselves, believing that they got a better, more consistent product that way. In 1991, 24 HPUs in my sample reported using glaze from the glaze cooperative.

A sign on the wall listed prices from 1987 to 1990. Prices for glaze varied over the years in both the cooperative and the Oaxaca store (Table 3.7). In 1993, the Mexican government issued new currency as the inflation of the 1980s had resulted in an inflated currency: $1000 MXP being worth approximately US$.33. The new peso dropped the zeros, making $1000 MXP equivalent to $1 MXN (new pesos). The cost per kilogram of mixed glaze rose steadily, going from 2000 MXP in 1987 to $8,000 MXP in 1990. By 1993, the price had been raised to $10 MXN per kilogram. The Oaxaca store consistently undersold the cooperative, going from $1600 MXP in 1984 to $4000 MXP in 1990. In the summer of 1994, during the economic crisis, with the consequent devaluation of the peso and concurrent inflation, costs rose to the point that the glaze cooperative was not functioning. In 1995, it was again operating, but the selling price of glaze was $18 MXN per kilogram.

Although in 1991 over 50% of potters in the town used glaze from the cooperative, the number of cooperative members had decreased from the original 24 to 15, with five working each week. Some had left because they did not want to spend the time working at the cooperative. Subsequently, disputes resulted in resignations of more members, and in 1995 membership was down to 12. The future of the glaze cooperative thus remained uncertain, impacted by rising costs, decreasing membership, and decreasing use of the green glaze resulting from national and international concern about its lead content.

OTHER SURFACE MATERIALS—These include two slips. Red slip is made by dissolving in water an iron-rich red earth from San Pablo Etla or San Felipe del Agua north of Oaxaca City. Use of red slip has a long history; it occurs in the Formative (Monte Albán I) Period buff (*crema*) pottery at Monte Albán (Caso et al., 1967) and, according to oral tradition in the town, was used by their ancestors prior to the advent of green glaze. A white slip available from the Oaxaca store was also used by some makers of *Artesanías*. Kaolin slip has been used since pre-Hispanic times (Caso et al., 1967); the mineral occurred at ancient hot springs where rocks had broken down (Payne, 1982, 1994, p. 8).

In 1992, some HPUs began to apply enamel paint to unglazed ware; by 1995, this practice had increased and some

HPUs were applying tempera paint to fired ware. Some HPUs experimented with glaze in colors other than green as decorative accents on *Artesanías*, mainly cobalt blue, yellow, and brown. These more expensive glazes were available through the Oaxaca store, and most also contained lead.

### Continuity and Change

By the 1990s, there had been some changes in ceramic materials and procurement from those of earlier periods. In the late 1960s, Stolmaker (Beals, 1975, p. 309) listed more potters in her sample using San Felipe Tejalapan clay than that from San Lorenzo Cacaotepec, but by the 1990s, the San Felipe mine had become deep and dangerous, and only one HPU in my sample was using that clay. Many more were using *laguna* clay, particularly makers of Domestic ware. Stolmaker (1996, p. 22) shows the *laguna* mine on her map as a clay source and lists a few potters as using a source on "communal lands" (Beals, 1975, p. 309), so this shift may have already begun by the late 1960s. A source of gritty clay called *La Casaguatera*, which Stolmaker (1967) listed as being used in the 1960s, was not in use in the 1990s.

Changes in procurement also occurred. Some potters were purchasing their clay in the late 1960s (Beals, 1975, p. 309). However, while the majority of potters using San Felipe clay at that time purchased their clay, the number of potters who dug clay was equal to those purchasing it. In contrast, in the 1990s only 25% of the potters in my sample using San Lorenzo clay dug their own. While trucks were in use for the transport of finished pottery to market in the late 1960s (Stolmaker, 1996, p. 39), there is no indication that they had replaced burros in the transport of pottery materials. While burros were still used by some in the 1990s, most HPUs using clay from San Lorenzo purchased both this clay and white gritty clay by the truckload, as did other potters at times. Clay materials, while utilizing sources and methods that were centuries old, underwent modifications as clay sources played out. The San Felipé clay source was used by only one potter in my sample, and he did not dig it himself but purchased it by the truckload as he did his gritty clay. Increasing numbers of potters utilized the services of men who dug and transported clay to the town.

The advent of plastic as a by-product of the petroleum industry resulted in some changes by the 1990s. Plastic sieves had replaced the metal ones for sieving the clay, and these, in turn, had replaced earlier ones made of sticks. Plastic sheeting served many purposes, from covering dry clay to wrapping clay bodies to keep them moist prior to and during the forming of pottery.

In the 1950s, most Atzompa pottery was green, and most potters ground their own glaze, although some of the materials could be purchased. In the late 1960s, many potters were buying glaze, and only a few still ground their own. By the early 1990s, all potters bought glaze. Glaze mills were used only to mix the materials by those few potters who had them, and there was a glaze cooperative in the town. Production of glaze had become less labor intensive; it was no longer ground from materials that had to be laboriously collected but was purchased from either of two sources: a local cooperative or a Oaxaca store.

As the 1990s progressed, the concern over lead glaze led to innovations, including increased use of red slip and glazes of colors other than green as decorative accents and, in the mid-1990s, the use of commercial enamel and tempera paint. While efforts were made to produce a lead-free glaze, the results were unsatisfactory. In 1996, a glaze manufacturer from Monterrey brought samples of a lead-free glaze to Atzompa for testing. The formula used borax instead of lead as a flux. It did not, however, produce satisfactory results in Atzompa kilns, and the manufacturer was continuing to work on the problem.

## CHAPTER 4: THE PRODUCTION PROCESS

Although the basic methods of forming pottery had changed little from those described by Jean Hendry and Charlotte Stolmaker, in the 1990s some modifications had occurred, mostly as a result of the increased production of *Artesanías* but also because of some change in materials.

### Forming the Pottery

Before a potter begins to form the ware, the clay body must be prepared. Soaked clay of choice is kneaded or sieved, as described in the previous chapter. If powder is to be added, it is spread on a mat and the wet clay kneaded into it, proportions varying according to the size of the ware to be made. The resulting clay body is wrapped in plastic and set aside until the potter is ready to use it.

Atzompa potters use four methods to form their pottery: the revolving platter, hand modeling, kick wheels, and molds. The first two methods are used for all three classes of pottery, and the kick wheel is used mainly for Greenware. Molds are used by some makers of *Artesanías*. The use of a revolving platter or turntable (*moldé* or *kabal*) is a widespread Mesoamerican tradition that was described by Foster (1959a, 1967), Rice (1987, p. 133), Arnold (2008, p. 234), and others. While the rotating platter is used by makers of all three classes of ware, makers of Domestic ware use only this method of pot forming. Forming times vary considerably by method and type of ware (Table 4.1).

Domestic Ware—Hendry (1992, pp. 66–69, 75–79) illustrated and described in detail the use of the revolving platter to form the Domestic pottery that was being made in Atzompa in the 1950s. The pot formers, usually although not exclusively women, spin it on an upturned jar or rotating base. The platter, a flat disk or convexo-concave ceramic platter, is approximately 4 cm thick and varies in diameter with the size of vessel to be made. Some potters make their own; others purchase them from other HPUs. The platters are made of *laguna* clay, even by those who use San Lorenzo clay for their pottery. Flat disks are used for casseroles, basins, and other flat-bottomed vessels, and convexo-concave platters are used for round-bottomed vessels. Generally, an inverted jar is set into a dirt floor, either in the house or on the veranda, the upper portion or neck and shoulder being buried in the dirt to make the olla stable, with its convex bottom forming the point of contact with the revolving platter (Fig. 4.1). In houses with concrete floors, the inverted olla is simply set on the floor. A small flat potsherd or cement sherd may be placed on top of the olla beneath the revolving platter. Hendry (1992, p. 84) observed a small rotating table or disk being used in the home of a male pot former, and in the late 1960s it was used by his son and two unrelated women (Stolmaker, 1996, p. 25). This may be the ball-bearing disk (*tornillo*) that I observed in the 1990s fastened to a cement pedestal set into the floor, the

TABLE 4.1. Some forming times.

| Class | Type | Method | Time |
|---|---|---|---|
| Domestic | olla | revolving platter, ball-bearing disk | 16–18 min. + 19 min. |
| Domestic | large basin | revolving platter | 1 hr., first stage |
| Domestic | griddle | revolving platter | 15 min. |
| Domestic | neck of olla | revolving platter | 1 min. 52 sec. |
| Domestic | large casserole | revolving platter | 7 min. 25 sec. |
| Domestic | small casserole | revolving platter | 4 min. 45 sec. |
| Greenware | vase | hand | 10–11 min. |
| Greenware | sauce dish | hand | 2–3 min. with appliqué |
| Greenware | sauce dish | hand | 1 min. 30 sec. |
| Greenware | animal | hand | 4.5 min. |
| Greenware | vase | hand | 4 min. |
| Greenware | sauce dish | hand | 2 min. 20 sec. |
| Greenware | bowl for salt | hand | 45 sec. |
| Greenware | mug | kick | 50 sec. |
| Greenware | miniature | kick | 30-40 sec. |
| Greenware | miniatures | kick | 1 min. |
| Greenware | mug | kick | 1 min. |
| Greenware | large vase | kick | 3 min. 42 sec. |
| Greenware | jug | kick | 2 min. |
| Greenware | miniature | kick | 1 min. |
| Greenware | jug | kick | 1.6 min. (22 in 45 min.) |
| Greenware | mug | kick | 1 min. 15 sec. |
| Greenware | vase | kick | 2 min. |
| Greenware | 58 jug handles | kick (hand) | 33 min. |
| Greenware | oval dish | revolving platter | 4 min. 16 sec. |
| Greenware | oval dish | revolving platter | 3 min. 57 sec. |
| *Artesanías* | sheep figure | hand | 1 hr. 10 min. |
| *Artesanías* | angel figure | hand | 1 hr. 47 min. |
| *Artesanías* | cross | mold, hand | 5 min. mold, 6 min. appliqué |
| *Artesanías* | virgin figure | revolving platter, hand | 2 hr. 53 min. |
| *Artesanías* | tall jar | revolving platter, hand | 2 hr. 45 min. |
| *Artesanías* | basket | revolving platter, hand | 15 min. |
| *Artesanías* | tall jar | revolving platter | 23 min. |
| *Artesanías* | bowl for flowerpot | revolving platter | 3.75 min. |
| *Artesanías* | dish with bird | revolving platter, hand | dish 5 min., bird 41 min. |

revolving platter being placed on the disk instead of on an olla (Fig. 4.2). In the 1990s, all users of these ball-bearing disks were women making Domestic ware vessel forms (i.e., ollas, casseroles, and basins). Of the two makers of large basins in my sample, one was using a ball-bearing disk purchased in Oaxaca; the other placed her revolving platter on a stone cobble buried in the dirt floor of her work area (Fig. 4.3).

In preparation for forming a vessel on a revolving platter, the potter places a pile of prepared clay, a bowl with water, some powdered gritty clay, an oval piece of gourd for scraping, and a small strip of leather for smoothing near the place where she will sit. Then she takes some clay, pats it with her hands to form a thick tortilla, and places it on her revolving platter, which has been sprinkled with some of the powder. She pats it with one hand, rotating the revolving platter slowly with the other, pressing the clay out until it has a low wall around the edge. With the leather piece, she pulls the clay wall up and smoothes the clay with the gourd. She does this by alternating between clockwise and counterclockwise rotation of the revolving platter. If she is making a large, high vessel, she adds coils to build height. Stolmaker (1992, p. 21) estimated forming times as about 10 minutes for a medium-sized casserole and a little more than half an hour for an olla 18 inches high. An accomplished olla maker in my sample spent 16 to 18 minutes for the first phase, then, after allowing the olla to dry while she made another, she put the first one back on the revolving platter, thinning the walls, first inside, then outside, by scraping with the gourd tool (Fig. 4.2; FMNH 329210; MST 118). During the rainy season, an olla would sometimes be left overnight before the second phase. Finally, she smoothed it with a *cazajuate* leaf (*Ipomoea murcoides* [Alvarez, 1994, p. 168]). She measured the diameters with a stick, the only potter I observed doing this. Interestingly, Hendry (1992, p. 79) also observed just one olla maker using sticks as measuring devices.

Production of griddles requires special preparation of the work area. First, the potter cleans an area of ground slightly larger than the griddle, removing vegetation and stones and smoothing the bare earth; next she spreads wood ashes on the cleaned area. One HPU purchased its wood ash from a bakery in San Lorenzo Cacaotepec. To form the griddle, she first makes a thick "tortilla" of clay in her hands, then lays it on the prepared space and stretches it until it is about 5 cm smaller than her revolving platter. Then, sliding her hands underneath, she lifts the incipient griddle and places it on the revolving platter, which has also been sprinkled with wood ash to prevent the clay from sticking. She scrapes the clay out to the edge of the revolving platter with a gourd tool and adds coils at the outer edge. The finished griddle is left on the revolving platter until it is partially dry. This process takes about 15 minutes.

GREENWARE—Makers of Greenware formed their pottery on the revolving platter, on the kick wheel, and by hand.

**Hand Modeling**—This method of forming pottery was described by Hendry (1992, pp. 81–82) when it was used during the 1950s in the making of miniature vessels known as toys (*juguetes*). After forming a round ball of clay, the potter

FIG. 4.1. Forming an olla on a revolving platter.

FIG. 4.2. Forming an olla on a ball-bearing disk.

makes an indentation, enlarging it with one hand while rolling the ball in the other hand. The piece is next thinned, smoothed, and formed into its final shape with the first two fingers. This technique, reported to have been developed at the end of the 19th century, by the 1990s had diffused through the Aguilar extended family and some other families. Potters were hand forming Greenware vessels as large as salsa dishes, ashtrays, and small vases (Fig. 4.4). A skilled practitioner could produce a salsa dish in a minute, as rapidly as a potter using a kick wheel. Hand modeling is also used by makers of *Artesanías* for forming both small figures and parts of large ones (Fig. 4.5) (MST 56).

**The Kick Wheel**—Two brothers of the Olivera family, Jacinto and Manuel, learned to use a kick wheel in a Oaxaca City pottery workshop in the 1940s. They purchased wheels, returned to Atzompa, and began to produce pottery using this technique. Hendry (1992, p. 84) mentions the kick wheel as a minor technique, used with limited success by a few men in the 1950s. By the late 1960s, its use had spread somewhat, primarily to members of the Olivera extended family, although in 1969 only nine men were using it regularly (Stolmaker, 1976, p. 192, 1996, pp. 25, 29). Use grew slowly, and in 1991 Jacinto Olivera reported 21 kick-wheel users, of whom two were women. Most were related to the Olivera family, but a few others had adopted its use. Although most were men, increasingly during the 1990s women and girls were learning this technique.

The wheel (Fig. 4.6) is suspended from a wooden worktable that has two legs on the front side, its back fastened to wall supports. Incorporated into it is a sling seat suspended with leather straps into which the potter must climb in order to work; the wheel and turntable are fastened to the center of the table. The turntable is located above the potter's waist, which, according to a North American potter informant, makes it difficult to form vessels of large size (Tracy Martin, pers. comm., 1992), and most kick-wheel users form relatively small vessels compared to those made on a revolving platter, approximately 26-cm maximum height (Fig. 4.7) (FMNH 339146). Before throwing vessels on a kick wheel, the potter kneads the clay body to the proper consistency and places it on the turntable, having previously sprinkled some powder onto the surface beneath the clay. He works the clay up, adding water as needed, making vessels from the top and cutting them off the lump of clay when done (U.S. potters call this "working off the hump"). The pace is rapid: a minute for a coffee mug, two for a small vase, 40 seconds for a 1-cm miniature vessel, and five dozen 6-cm miniature vessels in an hour. A kick-wheel user might make a gross or more of coffee mugs or several gross of miniatures in a week. In 1994, one maker of miniature vessels connected an electric motor to his wheel in order to make production less strenuous for him as he aged.

**Appliqué**—Both Greenware and *Artesanías* were often ornamented with appliqué. Although not strictly a forming

FIG. 4.3. Forming a large basin.

method, when used, it is an intrinsic part of the forming process. The technique, known as *bordado*, consists of the application of small pellets of clay to the surface of a vessel or figure while the clay is moist (Fig. 4.8). It is a relatively recent phenomenon that spread first through the extended families of its innovators during the last half of the 20th century and subsequently was attempted and utilized by others in the village. Its development by Catalina Aguilar in the 1940s and utilization and modifications by Teodora Blanco in the 1950s have been described by Hendry (1992, pp. 56, 82, 117–121). By the 1990s, HPUs unconnected to either family had begun to imitate the result, and there were some differences in the way appliqué was applied by those not taught by Aguilar family members. The strong family feelings about its use and diffusion are discussed in later chapters.

*Artesanías*—Makers of this ware used all four forming methods. In addition to the revolving platter, hand forming, and the kick wheel, some used molds.

**Press Molds**—The men who made animal figures in the 1950s used press molds, and Hendry (1992, p. 84) indicated that more potters used molds than the kick wheel. Although Stolmaker (1996, p. 25) suggested that this method seemed to have had less currency in the late 1960s, observing only two users, and that in the 1990s they had become more common. I saw several artisans forming the heads of figurines in plaster molds bought in Oaxaca City, and one HPU that specialized in miniature *Artesanías* used molds for one segment of its ware, sun and moon face pendants, crosses, and ornaments. Molds were also used by some makers of *chías*, the hollow animals with striated surfaces. Often, makers of *Artesanías* made figures and figurines combining several forming techniques; the body might be started on the revolving disk or formed by hand, the head or face made in a mold, and the limbs and ornamentation added by hand (Fig. 4.9).

### Finishing the Pottery

After a piece has been formed, it is set aside to dry. The initial drying takes place in the shade near the work area, usually inside the house; later, pieces may be set outside in the patio. Handles are added after the ware has partially dried. During the first phase of drying, vessels are set upside down. Subsequently, especially after the addition of handles, vessels are set upright. The location in which a piece is set to dry depends on weather and season, the strength of the sun, and the urgency to fire for market or to fill an order. If firing is immanent, pieces may be set in the sun but must be turned and moved frequently to prevent cracking during drying. Knowing when and how to place the ware to dry requires knowledge and skill, and inexperience, or mistakes can lead to cracks and

Fig. 4.4. Forming a vase using the hand-modeling method.

breakage. During the rainy season when drying is difficult, slightly damp pottery may be placed to dry in a kiln that is still warm following firing.

When the pottery is leather hard, it is scraped and burnished. Traditionally a task of men for Domestic ware, it is done by women in kick-wheel HPUs. Tools for these tasks are steel scrapers in various sizes and quartz burnishing stones; the scrapings are collected and soaked with new clay for use in future production. In the 1990s, Greenware was often incised with designs or words. "Oaxaca" or "Recuerdo de Oaxaca" (Reminder of Oaxaca) was thought to appeal to tourists, and the names of the honorees were often written on ware that had been special ordered for fiestas. Sometimes simple designs, often floral, were incised in addition to or in place of writing. Incising and stamping was done when the ware was leather hard, the customary tools being agave or maguey spines or metal nails. In addition to ceramic stamps, some Greenware potters made creative use of objects on hand, using such tools as bottle caps and the ends of magic markers to stamp designs on their ware.

*Artesanía* ware was sometimes neither glazed nor slipped, remaining the natural clay or bisque color, but makers of *Artesanías* also used red slip to highlight appliquéd or incised design elements, applying it either to unfired vessels or to bisque fired vessels in combination with colored glazes. In 1992, some potters began to apply enamel after firing, and by 1995, greater use of enamel and tempera paint could be seen. This was a change from the 1950s when Hendry (1992, p. 53) reported that decoration was either slipped, incised, or modeled and that, except for touches of white slip on red animals, pottery was not painted. In the 1990s, another use of red slip was in Redware. When leather hard, these slipped vessels were burnished, and when they had become thoroughly dry and hard, designs, usually delicate flowers and leaves, were incised into the surfaces (Fig. 4.10) (FMNH 339206, 339207). As mentioned above, in the 1990s this technique was diffusing through the second generation of an extended family.

Equipment and Spatial Organization of Work Areas—Probably the most striking physical changes in the appearance of the village since the 1950s and 1960s were in the area of house construction. These changes affected the buildings and work areas but did not appreciably alter the organization of space or general placement of pottery production. Both Hendry (1992, p. 134) and Stolmaker (1996, p. 13) described the locations of various functions on the house lot. Although variable, house lots always included an open space for pottery production, including clay and temper preparation and firing, and also space for such household tasks as laundry and dishwashing, with large ollas for water storage. The house lot might have farm animals and fruit trees. Sometimes there was

FIG. 4.5. Hand modeling a figurine.

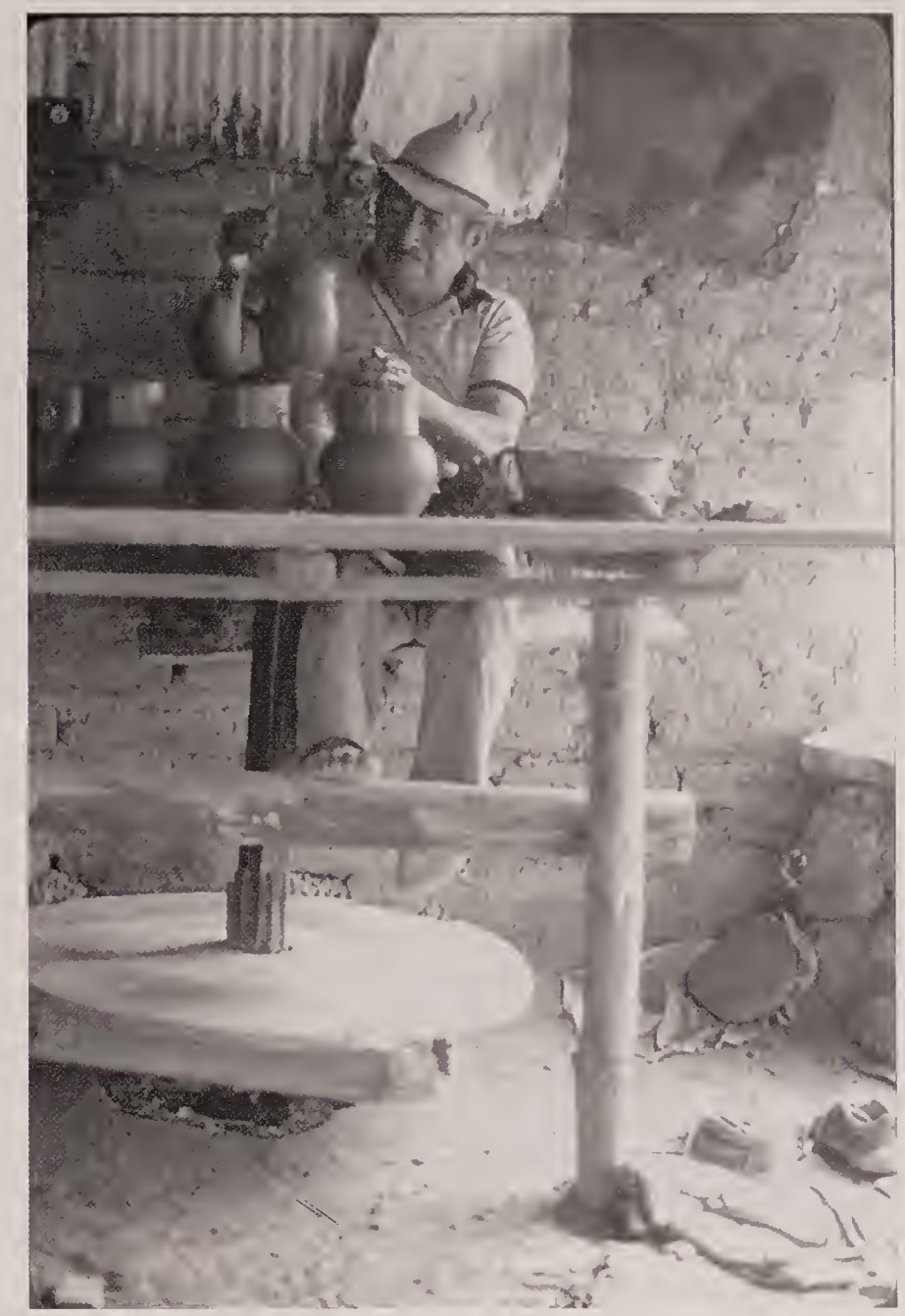

FIG. 4.7. Jacinto Olivera forming jugs on a kick wheel.

a kitchen shed of cane and maize leaves, or cooking might be done in a corner of the veranda, but it was rarely done in the living quarters. That space was needed for pottery production and storage of finished ware or maize.

This pattern prevailed in the 1990s with work areas specifically allocated for pottery production (Table 4.3); these

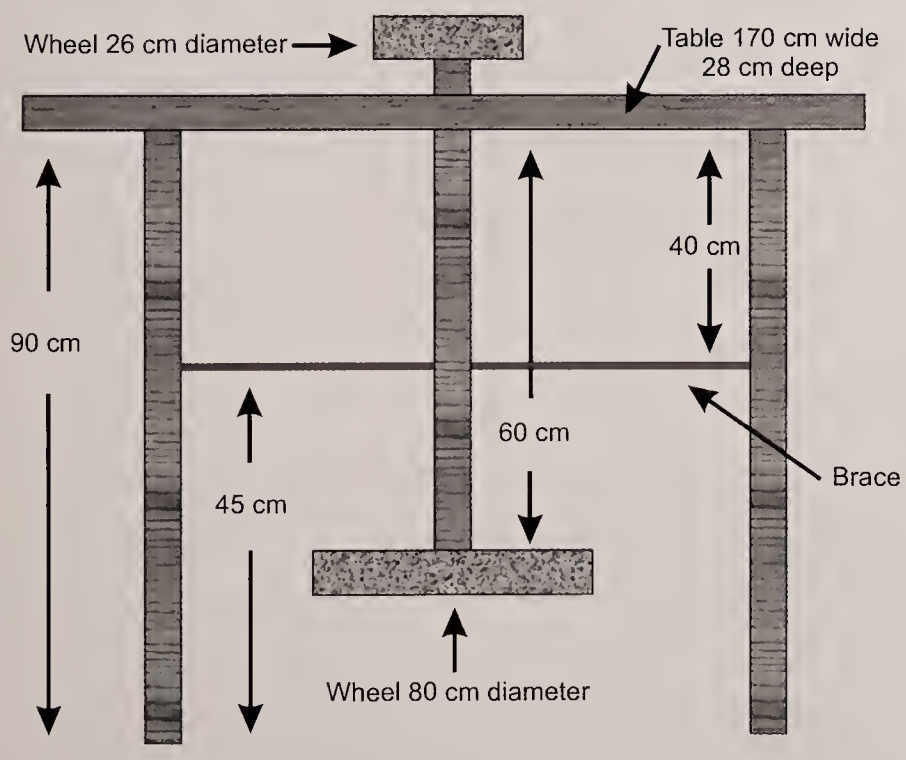


FIG. 4.6. Kick wheel dimensions.

included areas for clay storage and preparation, pottery forming, drying, and firing. Clay awaiting preparation was usually stored in baskets kept outside in dry weather and under cover in wet. As new houses were built or rooms added to older ones, potters turned rooms in former living quarters into work areas. Areas that might previously have been shared with pottery forming and storage became spaces used primarily for those purposes.

**Production Steps**—Those steps marked with an asterisk occur in all cases; the others are options that depend on the type of ware and the choices made by the potters.

CLAY

Acquisition

Dig soaked clay
Dig gritty clay
Dig colored earth
Purchase clay

Preparation

*Soak clay
Sieve soaked clay
Knead soaked clay
Beat gritty clay
Sift gritty clay
Knead soaked clay into gritty clay powder

FIG. 4.8. Adding appliqué to a figure of the Virgin.

FIG. 4.9. Adding decoration to an *Artesanías* figure.

FORMING THE WARE

*Form body of vessel or other piece
Add handles
Scrape
Burnish

DECORATION OF THE SURFACE (before firing)

Incise
Appliqué
Apply slip

FIRING

*First firing
*Check each piece
*Mend cracks or discard
*Get fuel

From own land, communal lands
Buy/use wood

*Load kiln
*Light fire
*Fuel and manage fire
*Check pottery for color
*Unload kiln
*Dust each piece

GLAZING

Purchase glaze pre mixed
Add extra copper
Purchase materials unmixed and mix in glaze mill
Apply glaze—pour, dip, or paint

Second firing

Get wood (sources vary)
Load kiln
Light fire
Fuel and manage fire
Check pottery for color

Unload kiln
Pack

**Firing the Pottery**

THE KILN—Atzompa pottery is fired in open-top updraft kilns constructed of adobe and stone. This kind of construction has a long tradition, dating at least to the Classic Period. Two Classic Period kilns were excavated in a residential area at Monte Albán in 1972–1973 (Winter & Payne, 1976; Payne, 1982). Two others, located on hills near San Lorenzo Cacaotepec, were excavated in 1981 (Winter & Nárdin, 1982). The similarity to the modern Atzompa kilns, particularly of feature 5, the larger Monte Albán kiln, is striking and discussed in Appendix IV. The particulars

FIG. 4.10. Incising decoration on a Redware vessel.

include excavation into bedrock, adobe and stone construction, and in feature 5 the spoked-wheel design of the grills that hold pottery. Although many modern Atzompa potters construct grills of arch or rectangular configurations, some use a spoked-wheel design, including those who make large ollas (Fig. 4.11).

TABLE 4.2. Tools and equipment for pottery production.

| Tool | Function |
|---|---|
| Revolving platter production | |
| Flat or concave ceramic disk | template |
| Gourd piece | to form and scrape |
| Stick | to measure |
| Leaf (*Ipomoea murocoides*) | to smooth surface |
| Kick-wheel production | |
| Kick wheel | |
| Piece of tin | to form exterior |
| Bowl sherd | to form interior |
| 2-m length of cord | to cut vessel from hump |
| Both forming methods | |
| Small bowl, gourd | to hold water to add to clay |
| Piece of deerskin or felt | to smooth rims or edges |
| Metal scraper | to scrape leather hard vessels |
| Quartz or marble stone | to burnish |
| Firing | |
| Updraft kiln | |
| Wooden paddles | to remove kiln coverings |
| 125-cm stick with metal hook | to open and unload kiln |

TABLE 4.3. Locations of work areas.

| Task | Location |
|---|---|
| Clay preparation | patio |
| Forming | shed or room with concrete or dirt floor |
| Finishing | indoors or on veranda |
| Drying | indoors or in covered or shaded area |
| Firing | kiln in patio |
| Glazing | in kiln area |

Potters living in the lower section of the town where there is less building stone construct their kilns of adobe; those in the upper section use mainly stone. Often a member of an HPU would have the expertise to construct a kiln. If not, arrangements would be made with a relative outside the household with the skill, or the HPU would hire it done. Kilns are generally set into a slope so that approximately half to a quarter of the back of the kiln is belowground. If a slope is not available, the ground is built up behind the kiln or the ground in front excavated. The floor of the firebox is usually about 30 cm below the ground level of the firebox opening. This opening ranges from 30 to 70 cm high and 20 to 60 cm wide. The pottery is placed on an open grid or series of arches that permit the fire to penetrate the firing chamber. Kilns are round, sometimes oval, although one innovative potter built a square kiln. Walls of kilns are generally from 20 to 30 cm thick (Fig. 4.12).

Each of the HPUs in my sample had at least one functioning kiln sometime during the fieldwork period. Some had more than one, usually of different sizes, enabling the HPU to fire more or less pottery depending on production and/or marketing circumstances. Ten HPUs in my sample had two kilns. Sometimes the larger one would be used for a bisque firing, and sometimes both were fired concurrently. At times a small kiln would be used for an irregularly scheduled firing of a special order. As HPUs were shifting to the production of *Artesanías* in the mid-1990s, some were building new kilns. By 1995, several HPUs had done this in order to fire more efficiently the smaller ware that they were producing. Finally, when a household dwindled in size because of the death or departure of members, it sometimes would allow a kiln to fall into disrepair. It might then fire at the HPU of an extended family member, as was also done by a newly established household until it could construct its own.

Kiln size, proportions, and type of grid are related more to vessel form and size than to the class of ware made by an HPU (Table 4.5). The kilns for larger Domestic ware, particularly large basins and ollas and also large *Artesanías* figures, generally have larger diameters and greater height at the front than those for smaller vessels (see 11 and 15 in Table 4.5). Some HPUs making miniatures had large kilns since they fired their pieces in saggers. Their kilns corresponded in size more to those of Domestic ware makers than to those of the makers for Greenware mugs, salsa dishes, and ashtrays. The kilns for the large basins have a protuberance or "ear" on one side for resting the rim of the stacked vessels.

Kiln longevity varies, depending on degree and quality of maintenance and probably also on the quality of the original construction. Maintenance consists of repairing cracks and periodic relining. After a number of years, the surface will begin to crack and break off. With repeated use, residues of green glaze accumulate on the grids and inner walls,

TABLE 4.4. Some production times.

| Form and method | Tasks | Times | Times | |
|---|---|---|---|---|
| Ollas, revolving platter | get T1 | 120 min. round-trip | 60 min. dig | 30 min. load |
| | get C2 | 45 min. | | |
| | form jar | 16–18 min. base | 19 min. collar | 23 min. scrape |
| | get fuel for first fire | 53 min. | | |
| | load kiln | 36 min., 55 min. | | |
| | tend fire | 50 min. | | |
| | glaze | 90 min. | | |
| | load second fire | 55 min. | | |
| | tend fire | 98, 118 min. | | |
| | unload | 50, 27 min. | | |
| | pack | 60 min. | | |
| Large basin, revolving platter | get C1 | 6 hr. round-trip | 3 burro loads | 3 days/week |
| | get T4 | 3 hr. round-trip | 3 burro loads | |
| Green, kick wheel | get T2 | 1.5 hr. | | |
| | get C2 clay | 2 hr. | | |
| | beat T2 | 4.5 hr. | | |
| | form vessel | 1.5–3 min. | | |
| | get fuel for first fire | 3.5 hr. | | |
| | load kiln | 20, 45, 17 min. | | |
| | tend fire | 1 hr. | | |
| | unload | 12 min. | | |
| | prepare pottery | 1.5–2 hr. | | |
| | glaze | 70 min. | | |
| | load second fire | 7 min. | | |
| | tend fire | 72, 44, 92 min. | | |
| | unload | 10 min. | | |

particularly in the kilns of those who make fully glazed Greenware. Also, the smoke from the glaze firing coats the inside, resulting in less efficient firing. The presence of these residues results in a need for more fuel to achieve the requisite temperatures. Thus when its kiln ceases to function well, the HPU would usually reline it. Some HPUs had maintained kilns for 40 to 50 years and report that they were built by their fathers or grandfathers.

As in forming pottery, some potters take infinite pains, constructing carefully and slowly over a period of months a kiln that will last for years. Others choose to build more quickly and replace more frequently. One HPU moved and reconstructed its kiln twice between 1989 and 1992. On the other hand, Teodora Blanco's son was still using his mother's kiln. Described below is the careful and meticulous construction of a kiln in an HPU that made prize-winning ollas.

Construction of a kiln was followed over a period of four months in the spring of 1991 (Figs. 4.13, 4.14). Work was intermittent, depending on time available from farming and other activities and on weather conditions. The members of the HPU—Gudelia Pérez Olivera, her husband Abel Ruiz Juárez, and their two teenaged sons, Abelito and Francisco—took time and care in all their activities. Gudelia formed ollas on a ball-bearing turntable, placed on a post set into the tiled concrete floor of her veranda. Abel Ruiz mined and prepared the clay and, assisted by his sons, scraped and polished the leather hard olla*s*. He was in charge of the firing, assisted by other family members.

As with the production of olla*s*, the kiln was built with meticulous care and attention to detail. The decision to construct a new kiln occurred because the old one was close to the gas tank for the kitchen stove, a location that had proved unsafe. His two sons assisted Abel Ruiz from time to time during the course of the four-month period. It was clearly a learning process for both youths. On 14 March, Abel and Abelito began excavation on a slope situated well away from the house. It took two weeks. They removed the shallow surface soil and excavated bedrock to a level surface, measuring the diameter with a stick to ensure that it was round. Depth at the back (upslope) was 84 cm and at the front 52 cm. After completing the excavation, Abel placed two stacks of bricks at the front to mark the eventual fuel portal. Standing in front of this "door," he made shoving motions to simulate potential stoking of fuel, then adjusted the bricks, made measurements with a stick, and further adjusted the opening. This took 10 to 15 minutes, after which he marked lines in the dirt for the portal width (33 cm).

The walls would be built with the bricks and stones from an old kiln that had been dismantled. These he bonded with a mixture of two special clays, thoroughly mixed with water. INNA analysis showed the composition of these clays to be quite distinct from the pottery clays, showing a higher level of calcium and strontium concentrations than the general Atzompa clays (Neff, 1992). Abel Ruiz carefully selected each stone, painstakingly fitting the larger ones and chinking them with small stones and sherds or pieces of broken tiles, often redoing sections. Only when satisfied did he mortar them with the kiln–clay mixture. By 10 May, the kiln had been built up to the level of the ground at the back, and construction of the arches was begun. The three arches would support the ollas during firing.

Next, Abel Ruiz took green *cazahuate* sticks (*Ipomoea murocoides* [Alvarez 1994, p. 168]). He bundled together sticks 2.5 to 5 cm in diameter and curved them to form the desired arch. On the arch, he placed bricks (Fig. 4.13). These were reported to be specially made for kilns by a brickworks east of Oaxaca City (Santa Lucia). During the construction, a wooden support was placed at right angles to the arches. Working from each side toward the center, he selected and fitted the bricks carefully, then bonded them with the kiln–clay. Later, he would cover the arch completely with a layer of the clay compound (Fig. 4.14). Since construction took place

FIG. 4.11. Grill with spoked-wheel design.

during the rainy season, completion was slowed by the need to allow sufficient time for drying at each stage. When the walls had been finished and the mortar and arches were dry, he coated the entire kiln, outside and inside, with a layer of the kiln-clay mixture and left it to become thoroughly dry before it would be used.

FIRING PRACTICES—Glazed wares are fired twice, the first, or bisque, firing at a lower temperature than the second, or glaze, firing. Burnished, incised Redware and unglazed *Artesanía* ware are fired once. In the 1990s, there was greater variability in scheduling and frequency of firing than Hendry (1992, p. 69) reported for the 1950s. At that time, the first firing was "customarily late Friday afternoon, with the second Saturday morning so as to have the ware ready for market day in Oaxaca." In the 1990s, firing of Domestic and Greenware was usually done weekly or biweekly, although scheduling could be affected by weather, fiestas, and market fluctuations. The variability in firing schedules was also related to the increased variety of both pottery and market outlets. Desiring to have their ware ready for truck transport to the Saturday market in Oaxaca City, some HPUs preferred, if possible, to complete their firing on Friday to be ready for pick up of the packed baskets late Friday night or in the early hours of Saturday. HPUs producing mainly on special order or for the *Artesanías* market generally fired with less regularity. As by 1995 an increasing number of HPUs was producing for those markets and for the *Mercado de Artesanías* in Atzompa, variability was increasing. Furthermore, as more HPUs were producing *Artesanías*, more fired their ware only once.

Fuel for the first firing was generally cane, sunflower or maize stalks, or other available material. This fuel is called *basura* (trash) to indicate the use of whatever is available. It often included sweepings of leaves and bits of plastic bags. This was especially the case for Domestic ware, although wood would be used if other fuel was not available. Fuel for the second, or glaze, firing was always wood, although one innovative HPU was observed firing with old rubber tires, and several used gasoline to start the fires. A hotter fire is needed for a glaze firing in order to fuse the glaze (Sheehy, 1988). Wood was also the fuel used for those wares fired only once. These include griddles, Redware, and the unglazed *Artesanía* ware. Some makers of miniatures and the finer Greenware used wood for both firings since they preferred to avoid the soot that might otherwise result.

In the 1950s, most firewood came from forests in the *municipio* or from San Felipe Tejalapan (Hendry, 1992, p. 71). By the 1960s, Stolmaker (Beals, 1975, p. 310; Stolmaker, 1976, p. 192, 1996, p. 25) reported that the Atzompa resources had been depleted and that more wood was being purchased from San Felipe Tejalapan vendors. Some men from Santo Tomás Mazaltepec or San Pedro Ixtlahuacas also came to Atzompa to sell wood, but this, too, was becoming scarce. At that time, one household agreed to try kerosene, but nothing came of it. Gas firing was also considered but ruled out as too expensive.

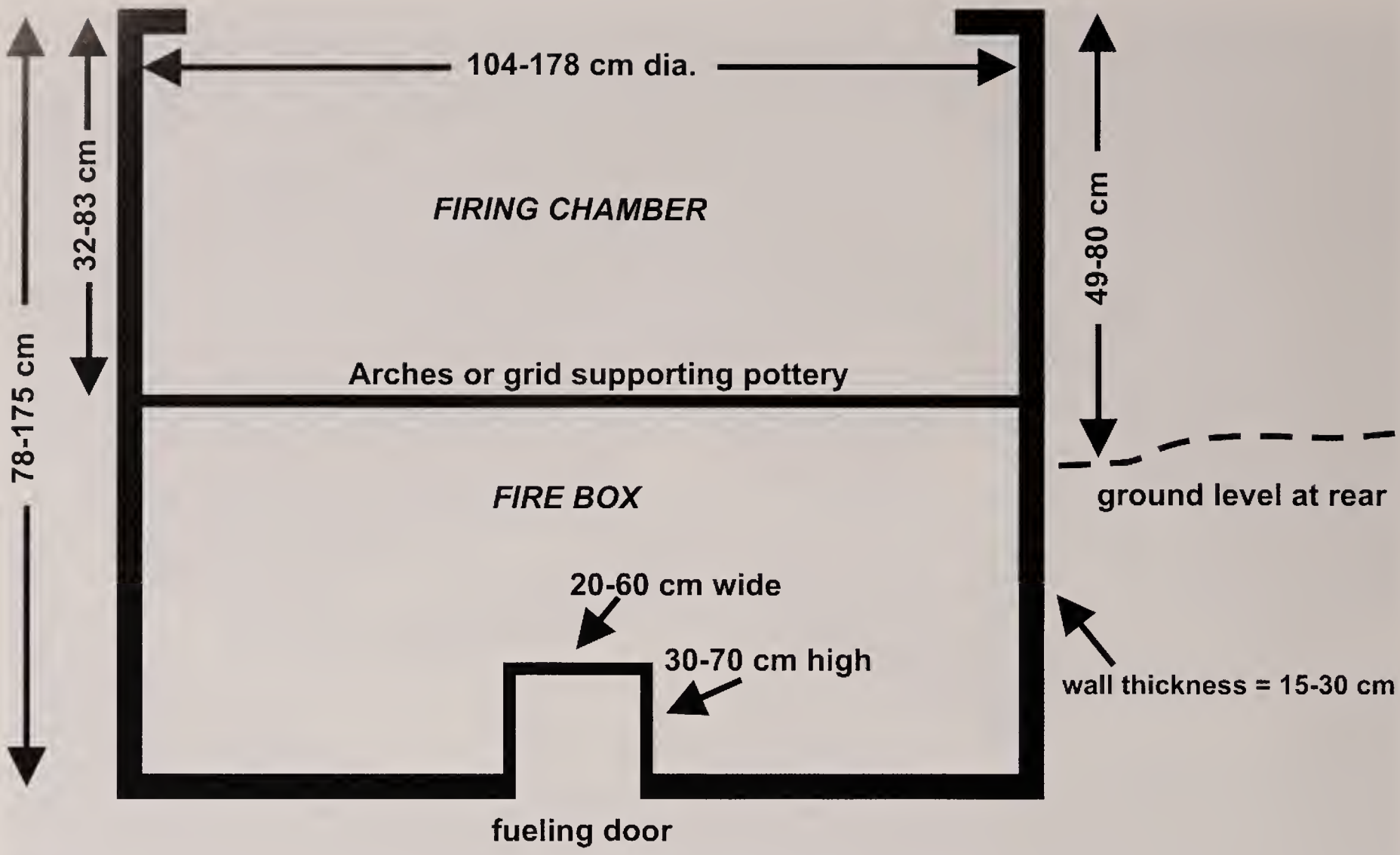


FIG. 4.12. Kiln dimensions.

In the 1990s, most firewood was brought by truck from Etla, about 20 km away (Table 4.6). It consisted of the trimmings from a sawmill there, cut to 2.5-m lengths. Prices were inconsistent but trended upward during the early 1990s. When funds were available, HPUs would buy a truckload as an investment, sometimes reselling the wood to other potters. The lengths of wood were also used to construct sheds for kitchens, washing, and pottery production or storage and to construct fences. These sheds and fences could be torn down readily to fuel kilns as needed. Costs per truckload ranged from $120 to $250 MXN during the study period, and an HPU could sell it for $.20 to $.30 MXN per kilogram to other potters. The lowest price was paid by the HPU that used San Felipe clay. As with its clay, it bought wood by the truckload during the dry season when it was less costly. Both Sheehy (1988) and Arnold (2008, pp. 282–284) have discussed problems of availability of firewood for potters as a result of deforestation, particularly for those located in or near urban areas with increased population density. In the last half of the 20th century, Atzompa potters made several adjustments in their fuel acquisition. The availability of trimmings from sawmills have, for the time being, solved that problem, but it may not be a long-term solution.

**First, or Bisque, Firing**—Loading the kiln for the bisque firing was done with care. First, before loading, each piece would be reexamined, cracks repaired, rough places smoothed,

TABLE 4.5. Kiln dimensions (cm).

| | Ware type | Diameter | Height, front | Height, rear | Arch | Top to arch |
|---|---|---|---|---|---|---|
| 1 | *Artesanías* miniatures | | 92 | 68 | grid | 28 |
| 2 | *Artesanías* miniatures | 104 | 115 | 42 | grid | 42 |
| 3 | *Artesanías.* | 106 | 98 | 60 | grid | 32 |
| 4 | Domestic small jars, bowls | 107 | 80 | 49 | grid | 49 |
| 5 | Green (kick wheel) | 125 | 78 | 53 | grid | 36 |
| 6 | Greenware | 125 | 78 | 53 | grid | 36 |
| 7 | Green (kick wheel) | 150/140 | 90 | 54 | grid | 45 |
| 8 | Greenware miniatures | 135 | 100 | 80 | cross | 52 |
| 9 | Greenware | 154 | 100 | 68 | grid | 46 |
| 10 | Greenware miniatures | 150 | 150 | 90 | arches | 38 |
| 11 | Domestic jars | 150 | 189 | 136 | arches | 83 |
| 12 | Domestic casseroles | 146/143 | 100 | 63 | grid | 37 |
| 13 | *Artesanías* large figures | 150/136 | 98 | 98 | grid | 50 |
| 14 | Domestic casseroles | 175/215 | 112 | 75 | grid | 58 |
| 15 | Domestic large basins | 221 | 126 | 37 | grid | 38 |

Fig. 4.13. Mortaring the bricks of the arch.

and handles reinforced with clay if necessary, all under the supervision of the man or woman who had formed the ware (Fig. 4.15). If a piece did not meet the HPU's standards, it would be discarded and put with the scrapings to be soaked and mixed with new clay for the next cycle. It was considered better to discard defective pieces before firing, when the clay could be reused by adding it to the trimmings. Placement and arrangement of pieces in the kiln would be done by the person in charge of the firing or under his supervision. This requires skill and experience. Boys learn by assisting their fathers or other adult men in the packing and fueling. Women and older girls might also participate in packing the kiln. Children help and learn by carrying the ware from the place where it has been readied to the person or persons loading. Miniatures are placed inside globular ollas perforated with small holes (*pichanchas*) (FMNH 329210) before being placed in the kiln; these serve as saggers to hold the small pieces. HPUs that made small vessels or miniatures often bought unfired larger ware to place over or under their small pieces in order to achieve better results in the firing. Generally, these purchases were made from neighbors or extended family members who were unable to fire themselves, either regularly or at a particular time because of illness or other circumstance. The arrangement might be direct purchase but more often on shares, a practice that will discussed further in Chapter 6.

Once loaded, the kiln is covered. Coverings consist of pottery; broken, cracked, and undamaged griddles; and sherds of ollas, large jugs, casseroles, and other vessels. In the 1990s, griddle makers regularly sold their ware to other HPUs for kiln coverings. Some HPUs covered their kilns with roof tiles or pieces of corrugated metal, a common building material for roofs, walls, and sheds, although some potters reported that covering with corrugated metal produced inferior firing results. After firing, kiln coverings were collected, saved, and stored around and inside the kiln for repeated use, firing after firing.

The person in charge of firing was usually a man (firing in HPUs without an adult male is discussed in Chapter 6). He fueled the kiln, monitoring it visually by looking at the pottery through the cracks, watching the smoke and the color of the ware. In the rainy season, he might let the fire burn slowly for up to an hour in order to dry the ware before building up the heat to firing temperature. The heat would always be built up gradually during the first portion of the firing and more rapidly in the second half. When he thought the pottery sufficiently fired, he would usually say so and then allow a few minutes to pass, during which the temperature would drop slightly, before starting to remove the coverings. He might be assisted in the firing by a boy or youth who fetched the fuel and sometimes helped in loading, thereby learning skills. If

FIG. 4.14. Working on the kiln walls.

elderly, the man in charge would often stand by and quietly supervise a grandson or other youth in the task (Fig. 4.16). A young person was usually allowed to participate in or handle the bisque firing before he would be given responsibility for the glaze firing, and often knowledgeable senior women would be consulted and also participate in checking the pottery. When firing was completed, the kiln coverings would be removed with two wooden paddles, then the fired ware was unloaded with metal hooks attached to long wooden poles (Fig. 4.16). It was necessary to dip these into a pail of water periodically to cool or to prevent the wood from catching fire.

Firing times ranged from 42 to 120 minutes. Breaking this down, unglazed *Artesanías*, griddles, and red-slipped and polished ware, for which this was the only firing, averaged 90 minutes; first firing of ware to be glazed averaged 63 minutes (Table 4.7). As part of my study, some temperatures were measured with a pyrometer and cones. While they varied depending on the placement of the measuring devices in the kiln, they ranged between 550°C and 725°C for the first, or bisque, firing (Table 4.8). After unloading, the bisque ware was allowed to cool and then dusted to remove ash or cinders. At this time, the pottery would again be examined for cracks or rough places, particularly handles and incised letters or designs. These were smoothed with the metal scraper and minor cracks mended with clay before glazing. Ware that would not be glazed was also dusted and examined for firing defects. Minor defects could be remedied by refiring the pieces and small cracks repaired with clay. Refiring would also

TABLE 4.6. Fuel costs.

| Date | Amount | Cost (MXN) |
|---|---|---|
| 1989 | 1 kg green | .20 |
| 1989 | 1 kg trim | .30 |
| 1989 | truckload | 160 |
| 1989 | truckload | 75 |
| 1990 | truckload | 120 |
| 1991 | truckload | 180 |
| 1991 | truckload | 150 |
| 1991 | truckload | 200 |
| 1991 | truckload | 150 |
| 1991 | truckload | 120 |
| 1992 | truckload | 200 |
| 1992 | truckload | 250 |

remove any charring from smoke or incomplete oxidation. Firing deficiencies in otherwise satisfactory ware could and should be remedied by refiring. Longer firing time is needed to fire thicker ware, such as the large basins, adequately, and one HPU that fired this ware for 61 minutes and removed the pieces immediately had a higher proportion of its vessels crack than one that fired for 88 minutes and allowed the vessels to cool in the kiln before unloading. Potters pointed out to me that it is possible to determine from looking at the core of a sherd that a piece was insufficiently fired, and some potters could be quite critical of the firing skills of other HPUs.

The bisque firing could be left to cool in the kiln and at times was left overnight. However, often it was unloaded quickly in order to proceed with the glaze firing or another bisque firing. Sometimes this would be done in order to utilize the heat stored in the kiln walls for another firing or to dry pieces that were still damp, particularly during the rainy season.

**Glazing**—Sources and composition of the green glaze have been described above. In the 1990s, most of the HPUs that used glaze bought it already mixed with water. They purchased it by the kilogram on the day it was to be used and brought it home in a plastic bag set in a pail, with the bag kept closed to prevent the glaze from drying out. Since the glaze minerals are suspended in water and settle out quickly, the product had to be stirred thoroughly and mixed continuously during application. Often the liquid glaze was transferred to a large pottery bowl to facilitate easy mixing, and it might be sieved through a cloth to remove any large particles.

To glaze a vessel, the liquid is scooped up or poured into it and sloshed around until coverage of the inside is complete, then the excess poured back into the glaze container. If the outside of the vessel is to be glazed, the suspended glaze is later poured over the vessel with a small gourd or plastic bowl. These steps were done separately. That is, a quantity of vessels would be glazed inside; then later, the same or a different person would glaze the outside. Since glaze dries quickly to a powdery surface that can be rubbed off fairly easily, the glazed pottery is handled carefully (Fig. 4.17). One HPU glazed its miniatures twice to achieve better coverage and color. Usually, an HPU purchased only as much glaze as it needed for a firing. However, unused glaze could be kept in a tightly closed plastic bag and remixed for later use if necessary, and any remaining glaze is rinsed from the pails or bowls and saved so that none is wasted. The male head of the HPU was often in charge of purchasing, mixing, and applying the glaze, but women were also observed to handle these tasks, perhaps

FIG. 4.15. Preparing the kiln and pottery for firing.

more frequently than in the 1950s, when Hendry (1992, p. 71) reported that "glazing too, is ordinarily done by the men, with the assistance of their wives."

**The Second, or Glaze, Firing**—When all pieces had been glazed, the kiln was loaded for the glaze firing (Fig. 4.18). Often unfired ware or pottery that needed refiring would be included to make a full kiln load. The loading was similar to that of the first firing, except that additional care was taken in handling the ware to ensure that the glaze did not rub off. In firing half-glazed ollas, one HPU took care that vessels not touch each other or the sides of the kiln, placing sherd spacers between the vessels and the kiln walls or other ollas.

Saggers, called *hornillos* or "little kilns," are used by makers of miniatures. Nails, fired into the bottom of a perforated vessel, protrude up from the base, and the glazed miniatures are set on them. Small animal figures were sometimes made with holes to enable them to be set on the nails (Fig. 4.19). The saggers have a limited life; since the heat of the kiln causes the nails to bend after a few months, they have to be replaced frequently. Most HPUs that used them made their own; as with revolving platters, they were made from *laguna* clay and white gritty clay, even by those who bought San Lorenzo clay for their pottery.

The temperatures of the second or glaze firing ranged from 600°C to 825°C, and firing times ranged from 45 to 120 minutes. The longest time was for firing the large basins and the shortest for small Greenware and glazed *Artesanías* that was inadequately fired. The average for 14 glaze firings was 73 minutes. Management of the firing resembled the bisque firing, except that the heat was higher and wood was always used. The fire was monitored visually, and when the pottery glowed, it was done. Unloading had to be immediate and rapid, or the glaze would fuse and vessels would stick together as they began to cool. As the pottery was unloaded, any piece that touched another either in the kiln or in a sagger was quiekly pulled apart while the glaze was soft. After the pottery had been set on the ground, a tinkling sound could be heard as the glaze cooled, and when the firing was at night, Greenware could be seen to glow brightly in the dark. Speed and skill in unloading is critical, and an HPU would gather as many experienced people as could be accommodated. These ineluded men, women, teenagers, and sometimes people from outside the HPU if it was a small one or had few adults. Usually these would be extended family members from other HPUs, often those whose ware had been included in the firing. On firing day, even those HPU members not otherwise involved in pottery production often gathered to assist in glazing, loading, and unloading the kiln. When unloading was complete, everyone would sit around cooling off from the heat of the kiln and admiring the result, and, as one potter informant told me, the unloading of the kiln has an atmosphere not unlike a ritual.

From HPU to HPU, there was considerable variation, innovation, creativity, levels, and differences in skills involved

FIG. 4.16. An older man supervises the unloading of a kiln.

in firing. Placement and arrangement of pottery requires skill and experience, as does managing the fueling and temperature. While boys and youths would assist their elders in the packing and fueling of the kiln, they were less likely to be in charge of the glaze firing than the bisque firing. As with the bisque firing, in some households women also participated in packing the kiln and determining when to end the firing. Weather factors such as rain and wind also play a role.

**Packing**—After the pottery cooled, it would be counted and checked carefully. Then if it was to be sold at the *Abastos* market in Oaxaca City, it might be packed tightly into large baskets (Fig. 5.1) ready for pickup by truck early Saturday morning for transport. Small amounts or small pottery might be packed in smaller baskets and go with the vendor on the bus. Ollas were sometimes packed in rope nets (Fig. 5.2).

Handling of an individual piece of pottery during production could occur as many as 15 to 20 times from its removal from the forming site, revolving platter, or kick wheel to the time it was packed for shipment. For example, a coffee mug made on a kick wheel was handled 16 times from when it was removed from the wheel until it was sold. If the weather had been inclement, it would have been moved additional times to protect it from rain.

Example of Times a Vessel Was Handled

1 removed from wheel
2 set upright in shade to dry
3 set upside down to dry inside or in sun
4 scraped and polished and designs incised
5 set on floor or ground upside down
6 loaded for first firing

TABLE 4.7. Firing times.

| Type | First firing (min.) | Second firing (min.) |
|---|---|---|
| Domestic casseroles | 77 | 80 |
| Domestic casseroles | 42 | 70 |
| Domestic casseroles | | 77 |
| Domestic casseroles | | 55 |
| Domestic casseroles | | 70 |
| Domestic globular jars | 50 | 75 |
| Domestic globular jars | | 118 |
| Domestic globular jars | 78 | 98 |
| Domestic large basins | 88 | 120 |
| Domestic large basins | 61 | |
| Green | 64 | |
| Green | | 90 |
| Green medium | 85 | 60 |
| Green medium | 60 | 50 |
| Green medium | 30 | 71 |
| Green small | | 55 |
| Green small | | 64 |
| *Artesanías glazed* | 43 | 45 |
| *Artesanías* glazed | | 70 |
| Redware | 66 | |
| *Artesanías* unglazed | 85 | |
| Domestic griddles | 120 | |

FIG. 4.17. Ofelia Aguilar glazing a vase (FMNH 339158).

7 unloaded
8 organized for glazing
9 glazed inside
10 glazed outside
11 loaded for second firing
12 unloaded
13 organized for counting
14 packed
15 unpacked
16 sold (might be handled once or twice more during sale process)

**Continuity and Change**

According to Hendry (1992, p. 115), in the 1950s, production of Domestic ware, ollas, basins, casseroles, and so on was pretty standardized, and each woman's production was little distinct from any others, although jugs were somewhat less standardized and some women rounded the bodies of their vessels more than others or varied the height of the neck. However, once a woman had established a style, she tended to conform to it. My observations confirmed this, and I also noted that in the 1990s an individual's output could sometimes be recognized by noting the kind of clay and whether colorant was added or decorations used. Makers of casseroles, for example, chose various ways to ornament the rims, sometimes adding fluting, pinching, or pressing decorative elements into them. When Donald Thieme came to assist me in the clay study, he measured the output of an olla maker to determine variation. That potter was offended at the suggestion that there was any.

Greenware producers were producing a greater variety of forms in the 1990s than they did in the 1950s, and an HPU's work could often be distinguished from its fellows by type,

TABLE 4.8. Firing temperatures.

| Type | °C | °C |
|---|---|---|
| Domestic globular jars | 550 | 725 |
| Green medium | 725 | 800 |
| Green medium | | 725 |
| Green medium | 650 | 750 |
| Green medium | | 725 |
| Green medium | 650 | 750 |
| Green small | | 775 |
| Green small | | 825 |

FIG. 4.18. Firing large basins.

size, or style of decoration. However, an individual potter's ware showed uniformity in both size and design, including the elements of appliqué. The products of kick-wheel users were consistent in size and form. A gross of coffee mugs made by Jacinto Olivera were essentially identical, and many potters took pride in their size consistency.

Production methods in the 1990s reflected both continuity and change. The option to purchase clay and glaze by freeing of male labor was a factor in the dramatic increase in the production of Greenware in response to tourist demands, and there were other small timesaving innovations. It also made it possible for women-headed households to function as pottery producers. The advent of plastic sheets and bags for holding glaze made glazing easier, and plastic was also used to cover prepared clay to prevent it from drying out. Plastic sieves for gritty clay lasted longer than the stick or rust-prone metal ones of the past. On the downside, local firewood sources had played out, and firewood had to be purchased from sawmills.

The number of potters using kick wheels increased as this technique spread through the Olivera extended family and beyond, and the users included some women. The roles of both men and women were changing, as is discussed in Chapter 6. In the middle of the decade, Greenware gradually became less salable as concerns about the dangers of lead glaze resulted in decreased marketability. Concurrently, there was the development and increase in production of *Artesanías*, which grew from its inception observed by Hendry in the 1950s to an important component of the Atzompa pottery industry.

## CHAPTER 5: PRODUCTION AND MARKETING STRATEGIES

### The Market System

The exchange of goods and services through a marketing system has existed for thousands of years in Oaxaca. The diverse microenvironments that led to village specialization in agriculture and craft production encouraged the creation of regional periodic markets, apparently held every five days in pre-Hispanic times, shifting to weekly during the Colonial Period (Whitecotton, 1977, p. 136). These weekly periodic markets continued to be important in the 20th century. The cyclical marketing system consists of established and regularized relationships through which goods are redistributed between communities and between producers and consumers. There are several levels of markets with particular markets operating on different days of the week (Cook & Diskin, 1976,

FIG. 4.19. Glazed miniatures are placed, inverted, on nails in saggers.

p. 51). The Oaxaca City market is the focal point of regional secondary markets, which in turn connect with villages markets (Beals, 1976, p. 32; Whitecotton, 1977, p. 243).

Goods flow between producers and consumers through this market system, which Beals (1975, pp. 41–42, 1976, p. 37) classifies as follows. *Intravillage exchange* occurs in two ways—between households in a village and between households and stores within the community—and can include loans, gifts, and barter. The category of *intercommunity* trade includes *village-to-village direct exchange* not passing through a market and *village-to-village exchange* passing through one or more local markets. *Village-to-marketplace trade* is the main route for goods leaving a village, and *marketplace-to-village trade* is the main route for redistribution of goods to villages. Through *intermarket trade*, goods are assembled in one market and passed to another for distribution. Finally, through *interregional trade*, goods go out of or into the regional marketing system. In modern times, goods entering the system include increasing numbers of manufactured items, and those leaving include items purchased by tourists. This system functions as an essential element in the economic and cultural lives of the people of the Oaxaca region.

The vendors may be the producers, or they may be traders (middlemen) who buy and sell, carrying the goods from village to village or market to market not only in the valley but also into the surrounding areas in the Mixteca and Sierras Juarez. Local usage defines a *mercado* as a permanent market structure occupied primarily by full-time traders or vendors with fixed locations, operating on a daily basis. In contrast, a *plaza* is an open-air marketplace occupied by intermarket traders or producer vendors; it is normally a weekly event (Beals, 1975, p. 8).

Beals (1975, p. 42) describes the following categories of vendors, although these roles were not always mutually exclusive:

> Producer vendors (*proprios*)
> Traveling middlemen or traders (*regatones*)
> Fixed location storekeepers, mostly resident in market towns
> Storekeepers selling retail to peasants and town dwellers
> Itinerant vendors (*ambulantes*) who have a stock of small items to sell on the street or door to door

Atzompa pottery flows through this marketing system.

### Outlets for Domestic Ware and Greenware

THE 1950s AND 1960s—Atzompa potters have long produced their ware almost entirely for use by consumers outside the town. In the 1930s, Elsie Clews Parsons (1936, p. 51) reported that a merchant from Atzompa came to Mitla in the Tlacalula valley to sell his green glazed pottery, which was very popular with the women there.

**The Saturday Market**—In the 1950s, the greater part of Atzompa weekly production went to the Saturday market in Oaxaca City, although it was also sold in Mixtec and Zapotec mountain villages (Hendry, 1992, pp. 56–57), something I observed in a 1992 market in Yalalog, a mountain Zapotec town high in the Sierras Juarez. Prior to the late 1970s, the main Oaxaca City market, the Juarez market, was located just off the main square in the center of the city. In the 1950s, some potters sent their pottery by truck, and others brought it themselves on burros or the bus (Hendry, 1992, p. 88). They would arrive early Saturday morning; although women were the most active traders, often the whole family came. Since transportation to Oaxaca and back to Atzompa was difficult, they would sometimes spend the night in the city if sales were slow. Some potters sold directly to the consumer, sometimes by the dozen but more often one at a time. Except for standing orders, sales always included bargaining rather than fixed prices, and bargaining was vigorous. Some sales were to tourists, and some potters shipped in bulk to North America. Others sold to traders or middlemen who placed standing orders with the potters; sometimes traders came to the village to collect the goods, thus saving potters the cost of transport. Many of the traders were women, and many had permanent stalls in the market (Hendry, 1992, p. 88).

Of Hendry's sample of 59 households, 63% sold at stalls in the market, 24% sold directly to middlemen, 2% sold regularly to both, and the rest showed no clear pattern (Hendry, 1992, p. 98). Thus, in the 1950s, while some Atzompa producer-vendors sold a portion of their pottery directly to consumers, most sold to middlemen, either in the open market or on consignment. While some of these may have been traveling middlemen, Hendry (1992, p. 88) indicates that many had permanent stalls (i.e., were fixed-location middlemen).

FIG. 5.1. A transaction at a stall of Greenware and ollas in the *Mercado de Abastos*.

**Other Outlets**—Although in the 1950s the majority of the sales were at the Oaxaca Saturday market, a few potters, primarily griddle makers, took their wares to sell in other villages, and one olla maker took the ware to Nochixtlan in the Mixteca Alta (Hendry, 1992, p. 89). Some potters set themselves up as traders, taking their own and sometimes neighbors' ware to weekly regional markets, such as the Sunday market in Tlacalula or the Monday market in Ocotlan (Hendry, 1992, p. 89). One more outlet should be mentioned. This is the informal open-air market (*plaza*) held every Tuesday on the street in Atzompa (Hendry, 1992, pp. 88–89; Stolmaker, 1996, p. 32). The pottery sold was mainly seconds, pieces that were considered to be of insufficient quality for sale elsewhere, a way for a potter to acquire a few pesos for what would otherwise be of no value (Hendry, 1992, p. 88–93). In the 1930s, most of the transactions were in forms of barter (Malinowski & de la Fuente, 1982, p. 103). Some of the small-scale itinerant traders often purchased their ware at this market.

There was yet another option. Some sold their ware unfired to other potters. Hendry (1992, pp. 94–95) reported that six of her sample of 59 did not fire their own ware, either because they had no kiln or because there was no man in the house to help them. Sales were usually to kin or neighbors. The price for selling unfired was below what a potter could get for finished ware, and these potters could feel exploited, but the buyers had to absorb the cost of glazing and firing. Thus, while there was little intravillage exchange (no Atzompa stores sold pottery), the other types of exchange were utilized. While some potters sold directly to Oaxaca consumers in the markets (village-to-village exchange), most sold to wholesalers who distributed the ware through intermarket trade within the region, and some pottery passed out of the region (*external exchange*), particularly the ornamental ware.

From October to May, sales would be good, pottery would be in steady demand, and Domestic pottery sold well throughout the state. The Specialties had a wider distribution but smaller volume, with few sales in rural areas except for the *chías*. These sold well during the Easter season and poorly at other times; demand for Domestic pottery fell off sharply during the rainy season, a period when production was also more difficult. Hendry's (1992, p. 93) informants suggested that many of the traders and their customers were farmers who must spend money on seed, not pottery, and also that roads were washed out, making transport difficult. The producers of the ornamental ware were less affected since their customers were not farmers. In late September, sales picked up as people began to prepare for Day of the Dead fiestas at the end of October.

In general, the same market practices were followed in the late 1960s with options to sell in the Oaxaca market, by the

FIG. 5.2. A potter and a trader finalize a sale of ollas, roped together for transport.

piece to individuals, in bulk to middlemen, or to take the pottery to another town for a slightly better price but higher freight cost. However, more potters were selling to traders and Oaxaca City shops (49%), and fewer were making lengthy selling trips (Stolmaker, 1976, p. 197, 1996, pp. 32–38;). While in the 1930s and 1940s (Parsons, 1936, p. 51; Stolmaker, 1976, p. 197) Atzompa potters traveled to other towns in the region to sell their pottery at the periodic weekly markets, by 1970 only eight in Stolmaker's sample traveled beyond Oaxaca City to sell, but 15 reported that their fathers had done so. Changes in modes and costs of transportation had affected this practice. Nevertheless, in the late 1960s, several griddle makers still transported the fragile ware from town to town by burro, perhaps because their customers were loathe to carry these fragile pieces home from regional markets themselves (Stolmaker, 1976, p. 197). Stolmaker (1996, p. 31) noted that it was not uncommon for potters to sell their ware unfired, a practice usually undertaken by the poorest potters, those in constant need of ready cash. They often asked for advances and so remained in debt. Another option was selling unfired ware on shares. The buyer would take a percentage of the finished ware as a fee for firing, and glazing might or might not be included.

The seasonal sales patterns persevered, with increased production and sale of decorative ware peaking before Christmas and Easter. It appeared that much of the trade was going to Mexico City and abroad (Stolmaker, 1976, p. 198). De la Fuente (Malinowski & de la Fuente, 1982, p. 104) noted that this was already occurring in the 1930s, when pottery from Oaxaca and Atzompa could be observed on sale in Mexico City at the shrine of the Virgin of Guadelupe and elsewhere during Holy Week. In the 1970s, Felipe Aguilar shipped regularly to three outlets in the United States, and another potter reported sending 20,000 pieces to Boston alone. However, while some Domestic ware could be seen in the Mexico City and Chiapas markets, the bulk of that ware remained in the Oaxaca market system (Stolmaker, 1976, pp. 195–198, 1996, p. 39).

THE 1990s—In the 1990s, potters had several options for selling their pottery. Both Hendry (1992, p. 88) and Stolmaker (1976, pp. 195–198, 1996, pp. 33–38) reported that their informants identified a principal or preferred sales outlet; this continued to be the case in the early 1990s when most HPUs making Domestic and Greenware sold the bulk of their finished goods to traders either at the point of production or on Saturdays at the main Oaxaca City market, the *Central de Abastos*. Sales on special order to traders were at fixed prices.

In the late 1970s, the main Oaxaca City market, the Juarez market, was relocated. The *Central de Abastos* was constructed on the southwest edge of the city, and vendors were forced to relocate there; it is reputedly one of the largest open-air markets in Mesoamerica (Murphy & Stepick, 1991, pp. 81–82, 114–115).

The main pottery section of the *Abastos* market (Fig. 5.1) was located at the back of this large market. It consisted of a permanent fenced area (*mercado*), with roofed and fenced permanent stalls of varying sizes (Fig. 5.1). Vendors also sold on the sidewalk and the street outside the fenced area (*plaza*) where large-scale buyers brought their trucks to load the baskets of pottery they had purchased. Although the majority of vendors in the pottery section of the market were from Atzompa, as was most of the ware sold, there were also vendors from elsewhere who bought and sold pottery made in Oaxaca City, other villages in the Valley of Oaxaca, and Puebla. A few women from the Zapotec-speaking village San Marcos Tlapazola would come each week and sell their Redware near the entrance to the pottery market. However, although the well-known blackware from San Bartolo Coyotepec was sold in some of the stalls, Coyotepec potters did not themselves sell their ware in the *Abastos* market.

Some Atzompa HPUs chose to rent or purchase stalls inside the enclosed area (*mercado*); others paid a small weekly fee to sell along the street in the outer unfenced area (*plaza*) (Table 5.1). Potters reported that the stalls were more costly and that sales at times were better outside on the street, but the stalls provided them with a place to store unsold ware for future sale. With no storage available, vendors in the street section sometimes had to lower their prices at the end of the day to dispose of unsold ware. An alternative was to arrange with extended family members with stalls to store their unsold ware for the following week's market. Some stalls in the market were staffed daily, mainly by full-time traders, including some from Atzompa, and some Atzompa potters with stalls were traders as well as producers, purchasing pottery from other HPUs. This they did in both in Atzompa and at the market. Most Atzompa HPUs, however, did not staff their stalls every day. However, a smaller market was held on Tuesdays, and some HPUs at times sent a member to sell then, particularly if sales had been slow on Saturday.

In the 1990s, pottery was transported from point of production to the Oaxaca market on Saturdays by truck or bus. The buses went into the city every half hour, and potter-vendors with baskets and net bags departed for the city as early as 6:00 A.M., their pottery placed on top or in the back of the bus as well as sharing a seat. To transport large quantities or large vessels, HPUs utilized the services of the several Atzompa residents who owned trucks. These entrepreneurs transported the ware on Saturdays for a small fee, traversing the town to pick up baskets of pottery Friday night or early Saturday morning and returning the empty baskets on Sunday or Monday.

In addition to the main pottery market, there were two other Oaxaca City outlets for Domestic ware and Greenware. Inside the main building of the *Abastos* market, there is a section of small stalls, known as the *Galeria*, which is open every day. On Saturdays, one member of an HPU would make the rounds of these stalls to sell, deliver, or take orders while another member staffed the stall in the pottery market. In addition, in the center of the city just off the main square, there is a street of small shops or stalls next to the Juarez market, the former main market. These shops cater mainly to tourists. Several specialize in pottery, and many Atzompa potters regularly visited these outlets, often taking and delivering orders as well as making direct sales to the shops.

**Traders**—Many HPUs had long-term trading relationships with particular middlemen who sought them out in the *Abastos* market or came at regular intervals to Atzompa to place and pick up orders (Fig. 5.2). According to Stolmaker (1976, p. 195), these relationships were "stable but flexible," and this continued to be so in the 1990s. Some provided cash advances against future deliveries. In addition to production for sale and for advance orders from traders, HPUs also filled special orders for people holding fiestas. Most sales were by the dozen, gross (12 dozen), or half gross. It was not uncommon for an HPU to make a gross of ashtrays, vases, or salsa bowls for a wedding, a 15th birthday celebration, or other special event. Both makers of the large basins in my sample made their vessels regularly on special order for clients from villages and towns throughout the state of Oaxaca who required them for the preparation of large volumes of food for fiestas. The people in charge of the fiestas came from towns in the Valley of Oaxaca or the mountains of the Mixteca to order the basins. Some would come to Atzompa to place these special orders and return to pick up the finished ware; others conducted their transactions on Saturdays at the *Abastos* market (Table 5.2).

TABLE 5.1. *Mercado de Abastos* costs.

| Location | Costs, 1991 (MXP) |
|---|---|
| Street place | $1000/Saturday |
| Inside stall | $4000/day |
| Inside stall | $30,000/month |
| Inside stall | $300,000–$400,000 to purchase |

There continued to be seasonality in the sales, peaking in October for Day of the Dead and at Christmas and Easter. Sales were also affected by weather during the rainy season. Although not a systematic part of my study, I visited regional markets in the Valley of Oaxaca, (Ocotlan and Tlacalula), in the Mixteca (Nochixtlán and Tlaxiaco), and in Yalalog in the Sierras Juarez. At these markets, I observed Atzompa pottery being sold by vendors who were not from Atzompa, mainly Domestic ware, jars, and jugs. In 1991, 11 stalls at the weekly market in Nochixtlán were selling Atzompa pottery. The buyers at these markets, although occasionally tourists, were usually women who were purchasing one or two pieces probably for their own use. However, one trader regularly purchased Greenware mugs at the Saturday Oaxaca market for sale in the Mixteca, where they were highly valued. Thus, while much of the sale of Greenware was to tourists, some had become a coveted prestige item in Oaxaca towns and villages; for example, small vases, ashtrays, or miniatures were ordered as favors for those attending weddings or other events, and large fully glazed vases could be seen in village and town churches throughout Oaxaca (Table 5.2).

**Other Outlets**—By the 1990s, few members of HPUs were traveling to other villages to sell. As the number of traders from outside the town had increased and more were buying directly from the potters, they reported that traders could transport pottery more economically and efficiently than they were able to do. The traders brought trucks to Atzompa or to the *Abastos* market to purchase from the potters. However, a few HPUs still traveled to regional fairs and periodic markets in the region, and one Greenware maker in my sample went each month to Mexico City to sell. By the 1990s, only one elderly man in a griddle-making HPU still took the ware to nearby San Lorenzo Cacaotepec by burro; most sold from the point of production to wholesalers who resold them in the Oaxaca market or elsewhere.

TABLE 5.2. Outlets and prices, early 1990s.

| Class | Type ware | Sale site | Date | Ask price | Sale price (MXN) |
|---|---|---|---|---|---|
| Domestic | casserole | Tlaxiaco trader | 7/90 | 4 ea. | |
| Domestic | casserole, large | Tlaxiaco trader | 7/90 | 10 ea. | |
| Domestic | casserole, small | Tlaxiaco trader | 7/90 | 1 ea. | |
| Domestic | casseroles | *Abastos* | 4/91 | 24/doz. | 10/doz. (0.83) |
| Domestic | casseroles | *Abastos* | 9/89 | | 15/doz. (1.25) |
| Domestic | casseroles (½ doz.) | *Abastos* | 4/91 | 30½ doz. | 20½ doz. (3.3) |
| Domestic | casseroles (24 doz.) | *Abastos* trader | 3/91 | | 12/doz. (1) |
| Domestic | olla, large | Tlaxiaco trader | 7/90 | 25 ea. | |
| Domestic | olla, medium | Tlaxiaco trader | 7/90 | 1.6 ea. | |
| Domestic | olla, small | Tlaxiaco trader | 7/90 | 4.5 ea. | |
| Domestic | ollas, medium | trader at house | 9/89 | 3.5/doz. | 3.5/doz. (29) |
| Domestic | ollas, small | trader at house | 9/89 | 3/doz. | 3/doz. (2.5) |
| Domestic | ollas with handles | on order | 5/91 | 12/doz. | |
| Domestic | ollas (4 doz.) | trader at house | 3/91 | | 0.4 ea. |
| Domestic | jug | Tlaxiaco trader | 7/90 | 1.5 ea. | |
| Domestic | jugs | trader at house | 3/91 | 8/doz. | 0.1 ea. |
| Domestic | jugs (4 doz. small) | *Abastos* trader | 4/91 | 18/doz. | 10/doz. (0.83) |
| Domestic | jugs (55) | *Abastos* | 4/91 | 18/doz. | 15/doz. (1.25) |
| Green | ashtrays | *Abastos* | 4/91 | 2.6 ea. | |
| Green | ashtrays (300) | at house | 4/91 | | 2 ea. |
| Green | candlesticks (6 pairs) | house | 6/92 | | 12 (1 ea.) |
| Green | candlesticks, large (36 pairs) | house | 6/92 | | 15 (4) |
| Green | casseroles, small | *Abastos* | 4/91 | 0.5 ea. | 3/doz. (2.5) |
| Green | coffeepots | *Abastos* | 4/91 | 3.6 ea. 36/doz. | |
| Green | frog pencil holders (12) | house | 7/91 | | 38 (3.16) |
| Green | fruit dishes | on order | 4/91 | 20 ea. | |
| Green | jugs, small | *Abastos* trader | 3/91 | 15/doz. | 10/doz. (0.83) |
| Green | jugs, small | *Abastos* trader | 4/91 | | 7/doz. (0.58) |
| Green | miniature animals | house | 7/92 | | 1.5 ea. |
| Green | mortars, pig faced | *Abastos* | 7/93 | 2.5 ea. | |
| Green | mugs | *Abastos* | 3/91 | 8–7/doz. | 6/doz., 5/doz. |
| Green | mugs | *Abastos* | 4/91 | 0.5 ea. | 4 for 2 (0.50) |
| Green | mugs | special order | 4/91 | 8/doz. | |
| Green | mugs | trader at house | 3/91 | 7/doz. | 5/doz. (0.42) |
| Green | mugs (1 gr.) | on order, *Abastos* | 4/91 | | 65/gr. (0.45) |
| Green | mugs (11 doz.) | *Abastos* trader | 4/91 | | 6.5/doz. (0.54) |
| Green | pen holders (frogs) | house | 5/91 | 15/doz. | |
| Green | salsa dishes, large | *Abastos* | 4/91 | 36/doz. | 3.6 ea. |
| Green | salsa dishes, small | *Abastos* | 4/91 | 2.6 ea. | |
| Green | salt cellars | house | 7/92 | | 2 ea. |
| Green | vases (200) | on order | 4/91 | 0.2 ea. | 0.2 ea. |
| Green | vases, small | *Abastos* | 7/93 | 2 ea. | |
| *Artesanías* | figure of a woman | house | 7/91 | | 70 |
| *Artesanías* | angel figure | house | 7/91 | | 5 |
| *Artesanías* | angel figure (18 cm.) | house | 6/92 | | 5 ea. |
| *Artesanías* | appliqué crosses (6) | house | 7/93 | | 7 ea. |
| *Artesanías* | appliqué crosses (4) | house | 7/93 | | 4 ea. |
| *Artesanías* | *chía* | house | 6/92 | | 1.5 ea. |
| *Artesanías* | face plaque | house | 6/92 | | 5 ea. |
| *Artesanías* | jar, tall | on order | 5/91 | 50 ea. | |
| *Artesanías* | miniature animals | house | 7/91 | | 2 ea. |
| *Artesanías* | miniature animals | house | 7/94 | | 150 @ 2 ea. |
| *Artesanías* | moon pendants | house | 7/91 | | 2 ea. |
| *Artesanías* | sun pendants | house | 7/91 | | 3 ea. |
| *Artesanías* | virgin figure | house | 7/91 | | 10 |

As formerly, the open-air street market held in Atzompa on Tuesdays and Fridays continued to provide a way for HPUs to acquire quick cash or to dispose of small amounts of unsold ware through sale or barter to buyers who come to the town looking for bargains. Some small-scale vendors who sold produce, clothing, fruit, or other goods also visited particular HPUs to sell their wares and purchase pottery. These trading relationships might include the barter of goods for a few pieces of pottery. Hendry (1992, 98, endnote 3) noted that barter appeared to be less common than it had been reported for an earlier period. However, I observed many occasions of barter both in the Atzompa market and at the houses of producers, the frequency perhaps related to the instability of the currency in the early 1990s.

The option of selling ware unfired to other HPUs was as important an alternative in the 1990s as it had been in the 1950s and 1960s. As formerly, selling pottery unfired was usually undertaken when a potter was unable, for physical or economic reasons, to fire. Two HPUs in my sample bought or sold unfired ware on a regular basis, and this option was always available for any potter when illness or other misfortune made firing difficult or impossible for short or long periods of time. As mentioned above, makers of small Greenware often purchased unfired casseroles or other large Domestic vessels to fire with their ware.

In the mid-1990s, some potters sold unfired ollas, griddles, or other vessels to HPUs who transformed and ornamented them for the *Artesanía* market.

During the 1990s, there was increasing awareness and discussion in the town about U.S. regulations prohibiting the import of lead-glazed pottery, about local and national publicity about its danger, and about the Mexican legislation designed to discourage its use. Studies of health problems caused by lead, most particularly lead-glazed pottery, include one in Atzompa as a result of public health concerns about lead exposure (Hernández-Serrato et al., 2003). A sample of 185 households was randomly selected, and 413 adults were interviewed and blood samples taken. The sample included both potters and nonpotters, and the majority were women between 26 and 55. The team concluded that there was high lead exposure even in those who were not potters and that the smoke and fumes from the firing process played an important role, indicated by the fact that men had the highest blood lead concentrations.

Already in 1991, potters were discussing decreased sales of Domestic and Greenware, and by 1993 there was a noticeable increase in the proportion of unglazed *Artesanías* being produced as well as increased concern expressed about decreasing sales of cookware. In 1995, it was reported to me by several potters that North Americans were not buying in the *Abastos* market.

### Outlets for *Artesanías*

The market outlets for *Artesanías* differed from those for the Domestic and Greenware classes. *Artesanías* were not sold in the Oaxaca City *Abastos* market, at the shops near the Juarez market, or in regional periodic markets but rather were sold by the potters directly to Oaxaca and Atzompa shops, government outlets, and middlemen who shipped them elsewhere in Mexico and abroad. Already in the 1950s, Teodora Blanco was selling her musical animals and ornamental jugs to a handicraft store in Oaxaca City, and through her that store sometimes bought from other makers of decorative ware (Hendry, 1992, p. 93). In 1969, she sold regularly to the Museo de Arte Popular in Mexico City (Stolmaker, 1996, p. 39).

The number of shops in Oaxaca City that served as outlets for *Artesanías* continued to increase in the mid- to late 1990s, and each year more HPUs who made this ware were operating shops or selling out of their houses. Most sold their own ware, but some acted as middlemen for other HPUs. Potters also sold directly to buyers who came to the town to purchase pottery for stores in major cities in Mexico and the United States. Some HPUs established trading relationships with buyers from Mexico City, Monterrey, Acapulco, and Texas, who in turn sold the ware in Mexico, the United States, Europe and even Japan. Several artisans traveled yearly to Santa Fe, New Mexico, to demonstrate their craft as well as to sell; others traveled to fairs elsewhere in the United States and Europe. One very entrepreneurial HPU had received external recognition, and two of its members traveled abroad regularly to give demonstrations, and their Atzompa shop had become a regular stop for tourist buses. The opening of the *Mercado de Artesanías* in Atzompa added an additional outlet.

The *Mercado de Artesanías*—In 1991, a new outlet opened, *La Casa del Artesanos* (House of the Artisans), also called *La Casa de las Artesanías*. In the late 1980s, a *Unión de Artesanos* (a guild or union of artisans) had been formed. About 70 potters were invited to join; around 50 did, although some later dropped out. In 1991, there were 40 members. A plan to construct a building developed from the interest and leadership of this group. The *Unión* secured town, state, and federal funding for the construction of a market building. *Unión* members were asked to pay a fee ($40,000 MXP) and contribute labor for cleanup and finishing. On completion. a formal opening was held in April 1991, with Mass performed by a priest, followed by speeches by a representative of the state governor and the head of the *Unión de los Artesanos*. Bus loads of tourists arrived to view the pottery and the demonstrations given by the potters. However, there were problems with faulty construction and lack of security. There was no space for potters to store their wares safely, and although a few potters brought their wares to sell on Tuesdays and Fridays, they were willing neither to leave their ware unguarded nor to carry it back and forth daily. Then the roof collapsed during the rains of 1991.

In 1992, the building stood empty, and many members of the *Unión* expressed anger about the way the building had been built and the use of planners and builders from outside the town. There was also lack of agreement throughout the town about the building's use and the lack of access to it for townspeople who were not members of the *Unión*. Old feuds and resentments between potter families surfaced, and some who were not asked to join objected to the use of *municipio* funds for a project that did not serve all. These problems were gradually resolved, and by the summer of 1993 additional funds had been made available from the State of Oaxaca Department of Tourism and from the *municipio*. With greater local control, repairs and improvements were accomplished, and the market reopened in October 1993. Water, electricity, and security had been added, and membership broadened. In 1995, the name was changed to *Mercado de Artesanías*. New signs, sponsored by Coca-Cola, were put up along the road to the town and on the entrance to the building. The market was open every day, and there was regular traffic of tour buses and wholesale buyers from Oaxaca City and elsewhere.

Membership in 1994 was between 45 and 50 individual potters, including 11 HPUs in my sample. The potters represented all sections of the town and all three classes of pottery. Each member had a numbered stall consisting of a set of shelves marked with his or her name and membership number, and each member paid a fee to cover costs of utilities and maintenance (Fig. 5.3). There was a weekly schedule of assignments for each member, and although membership was in an individual's name, the duties were shared by others in the HPU of the named member. By the winter of 1995–1996, there were 70 named stalls. Some sold only their own pottery; others sold the ware of other HPUs who might not be members. The variety was representative of the universe of Atzompa pottery, including all three classes of ware. Atzompa was now on the regular tourist circuit, and the tourists came in bus loads on regular schedules to the *Mercado* (for a discussion of the dynamics of interaction between members of the *Unión* and the town mayor and also the important roles played by women in its operation in late 1990s, see Pérez 1997, 2003).

### Continuity and Change

In summary, Atzompa potters have long produced their ware almost entirely for sale to and use by consumers outside the town, participating in the traditional market system that has

FIG. 5.3. Stall in the *Mercado de Artesanías* in 1996.

been an important feature of Oaxaca for millennia. This can be understood by examining the types of exchange described by Beals (1976, p. 37) as they relate to Atzompa pottery production in the late 20th century. There was little intravillage exchange of pottery in Atzompa. While most household possessed a large basin for soaking clay and a large olla for water storage, these vessels last for many years and do not need frequent replacement. Clay griddles are not as durable, but in the 1990s more households were using metal ones for cooking tortillas, although, as noted above, griddles were sometimes purchased for kiln coverings. Otherwise, except for damaged pieces, potters rarely kept and used their own pottery or that of other potters. On occasion, decorative pottery might be acquired from another potter as favors for guests at such special events as weddings, for example, vases incised with the name of the bridal couple. Until the mid-1990s, there were few if any stores in Atzompa that sold pottery. However, after the *Artesanía* market was established, both potter proprietors there and potters with their own stores sometimes purchased the ware of other potters. While this was a form of *i*ntravillage exchange, it should be noted that the buyers of the pottery in both the market and the stores were outsiders, tourists, or traders, resulting in the pottery passing out of the community.

Intercommunity trade includes village-to-village direct exchange, goods not passing through a market, and village-to-village exchange, in which goods passed through one or more local markets (*plaza*). The pottery sold at the Tuesday market in Atzompa falls mostly into the latter category, although some of the traders also visited particular potter clients to buy or barter for a few pieces (direct exchange). While in the past some Atzompa HPUs took their pottery to other villages (Hendry 1992, p. 89), in the 1990s only one household in my sample did so: the elderly man who took griddles by burro to San Lorenzo Cacaotepec.

Stolmaker (1976, p. 197) reported that in the late 1960s, a higher proportion of potters was selling to traders and to Oaxaca shops than had been the case in the 1950s; the number of the Oaxaca stores had increased, and fewer potters traveled to other towns themselves than previously. Thus, there was a decrease in intercommunity village-to-village exchange and an increase in intermarket exchange. Also, with the increase in the production of decorative ware for the tourist market, the amount of external exchange increased as more of this pottery passed out of the regional marketing system.

Village-to-marketplace and marketplace-to-marketplace trade has long been the principal way in which Atzompa pottery was distributed. Atzompa potters transported their Domestic and Greenware to the Oaxaca market and sold it to traders for sale there or in the secondary markets at Ocotlan, Tlacolula, and other secondary or village markets in the Valley of Oaxaca, the Mixteca, or Sierras Juarez. One can also note the development of both interregional and international trade in Greenware and *Artesanías*, the latter occurring outside the traditional marketing system.

Market demand is an important factor in innovation and change in forms and styles (Foster, 1965, pp. 52, 59; Mossman

TABLE 5.3. Market outlets—changes in the 1990s.

| Class | Type | Outlet 1990–1991 | Mid-1990s changes |
|---|---|---|---|
| Domestic | griddles | house, San Lorenzo Cacao (by burro) | |
| Domestic | casseroles, flowerpots, vases | *Abastos* market stall, bought from extended family | deceased |
| Domestic | casseroles, mortars | *Abastos* market stall and street | |
| Domestic | casseroles, | *Abastos* market stall, traders | |
| Domestic | large basins | special order to other towns | |
| Domestic | ollas, bowls, basins | trader Ocotlan, Atzompa street market | |
| Domestic | casseroles | unfired to father | unfired to artisan |
| Domestic (*Artesanías* later) | large basins | special orders for fiestas | stalls Atzompa *Artesanías* market, house |
| Domestic (*Artesanías* later) | ollas | trader Ocotlan | stall Atzompa *Artesanías* market |
| Green | miniatures | *Abastos* market stall | closed stall |
| Green | ashtrays, dishes | *Abastos* market stall | joined family *Abastos* market stall |
| Green | miniatures | *Abastos* market stall with sons, traders | smaller *Abastos* market stall |
| Green | miniatures | *Abastos* market stall with sons, traders | smaller *Abastos* market stall |
| Green | vessels | *Abastos* market stall, Atzompa street market | *Abastos* market stall, closed stall |
| Green | vessels | *Abastos* market stall, Mexico City monthly | |
| Green | jugs, mortars | *Abastos* market stall, traders at house | |
| Green | vessels | *Abastos* market stall, traders, gallery | retired, ceased production |
| Green | casseroles | *Abastos* market stall | stall Atzompa *Artesanías* market |
| Green | vessels | shared *Abastos* market stall, traders | |
| Green | appliqué vessels | shared *Abastos* market stall, traders, barter | |
| Green | appliqué vessels | shared stall *Abastos* market, special orders, fairs | stall Atzompa *Artesanías* market |
| Green | vessels | unfired to sisters | deceased |
| Redware | incised vessels | *Abastos* market street, traders | |
| *Artesanías* | dishes, figures | Oaxaca shops, special orders (Japan), Atzompa street market | Atzompa *Artesanías* market |
| *Artesanías* | various large | shop in house and Oaxaca shops | |
| *Artesanías* | miniatures | house shop, Oaxaca shops, special orders, fairs | Oaxaca stall, Atzompa *Artesanías* market |
| *Artesanías* | various | shop in house, special orders | |
| *Artesanías* | various | shop in house, special orders | Atzompa *Artesanías* market |
| *Artesanías* | various | shop in house, traders | Atzompa *Artesanías* market |
| *Artesanías* | figures | special orders to traders, shops | |
| *Artesanías* | animal musicians | Oaxaca shops, government outlets, special orders | |
| *Artesanías*/Domestic | figures, flowerpots, casseroles | Oaxaca shops, special orders, Atzompa street market | |

1988, p. 217), and there is no question that tourism has been a major factor in the marketing of Atzompa pottery. In the late 1980s, foreign tourism in Mexico increased dramatically, becoming second only to oil (Kaplan, 1993, p. 114), and this does not include the numbers of Mexican tourists, especially those from Mexico City who throng to Oaxaca for holidays. The changes in Atzompa, although coming a decade or more later, bore similarity to the changes in production and marketing strategy that occurred in Acatlán, just over the border of Oaxaca in the State of Puebla. The shifts and fluctuations in the numbers of tourists passing through that town with the development of the Pan American Highway had successive impacts on the styles of pottery being produced there (Lackey, 1988).

Successive changes in the production and marketing strategies of Household Production Units occurred in the last decades of the 20th century. Improved transportation to and from Oaxaca City facilitated sale to increasingly wider markets. This had had an impact on the producers of Greenware who had responded with increased production to the growing market demand for this ware in the decades prior to the 1990s. By the mid-1990s, concern and legislation restricting sale of lead-glazed pottery led to a decreasing market both for this ware and also for Domestic ware. This affected the continued growth of the *Artesanía* class, leading to greater diversity in both production and marketing strategies. Some makers of Domestic ware sold their unfired vessels to artisans who added ornamentation to turn them into *Artesanías*. Others began to add the production of *Artesanías* to their repertoire.

By the 1990s, selling strategies had already become more complex than in earlier periods, and they shifted in the course of my study. In 1990–1992, only eight HPUs of my sample indicated that they used primarily only one outlet, selling either at the Oaxaca Saturday market or to a trader on consignment (Table 5.3). All the others had multiple outlets, either selling both in the market and on special order or to the increasing numbers of Oaxaca City stores. While only three or four potters sold *Artesanías* from their houses in the early 1990s, by the mid-1990s this had more than doubled and continued to increase as the *Mercado de Artesanías* brought more tourists and traders to the town. Some of these shops

also carried the ware of other HPUs. Concurrently, an olla-making HPU that had formerly sold all its ware on special order to a trader for resale at the markets in Ocotlan and Tlacalula reported that the trader no longer brought them orders. At first, they sold their ware unfired to makers of *Artesanías* but soon began to ornament the ware themselves and sell from their own stall in the *Mercado de Artesanías*. Thus, there was an increase in intravillage exchange, a type that had previously been very minor. At the same time, there was less village-to-village exchange carried on by producer vendors or traders. Very few HPUs carried their ware to other towns or village markets, and the amount of Domestic ware that could be seen in the regional markets in Tlacalula and Ocotlan decreased each year during the mid- to late 1990s. Whereas in the past the majority of consumers of peasant products were peasants (Beals, 1975, p. 41), and this may have been still true even in the early 1990s, by the mid-1990s, with the increased demand for *Artesanías* and the increasing number of outlets, this was shifting for Atzompa potters.

In summary, by the early 1990s, the production and marketing strategies of Atzompa HPUs had undergone significant changes from the 1950s and 1960s and continued to change as the decade progressed. More potters were choosing to produce the purely decorative *Artesanía* class, which used glaze sparingly if at all, and the market for this ware continued to grow. By the mid-1990s, HPUs were maximizing their options through utilization of several outlets concurrently or consecutively, combining and shifting strategies from year to year, with production often explicitly oriented toward lucrative markets. Also, production appeared to be more market driven than Hendry (1992, p. 98) reported for the 1950s. Although at that time some potters adjusted their production to seasonal fluctuations and the demands of the middlemen within the limits of their *oficio* type and several women went so far as to change their *oficios*, taking up ones they believe would be more profitable, it was not nearly so common at that time as we have seen it to be in the mid-1990s. Although the intraregional market for Domestic ware was decreasing, with the opening of the *Mercado de Artesanías* and the increased number of both Atzompa and Oaxaca City stores selling *Artesanías*, the number of market outlets for that ware had increased substantially, giving Atzompa producers a bigger range of choices for the marketing of their pottery.

## CHAPTER 6: FAMILY DYNAMICS

### The Household Production Unit (HPU)

As elsewhere in Mesoamerica, in Atzompa the household is the focus of identity and the primary social and economic unit; it includes those who live under one roof or in one compound and have a common kitchen. A strong sense of collective identity also prevails in Atzompa households; Household Production Units claim ownership of pottery production, and although individuals do own property and keep track of earnings, ownership of production is assigned not to an individual but to the HPU, similar to what Sol Tax (1953, pp. 11–12) found in Panajachel, a Maya town, and John Monaghan (1995, p. 35) noted in the Mixtec town of Nuyoo. An individual's receipt of prizes and formal or informal recognition for innovation and creativity from the outside world is in conflict with traditional attitudes, which emphasize the shared production process of the HPU. An olla maker who won prizes for her ollas said, on occasion of being introduced, "*We* make jars." Her husband privately expressed annoyance that when he went to a government outlet to pick up money owed for jars, they would give it not to him but only to her, although, as he said, he had mined and prepared the clay, scraped, glazed, and fired the jars. Also, although the stalls in the *Mercado de Artesanías* are assigned to named individuals rather than to households, HPU members share the tasks of selling and attending to the various tasks required of members.

Division of Labor—In Atzompa, the successful production of pottery generally requires the participation of both the men and women of a Household Production Unit. As materials, materials procurement, and techniques of production changed, the division of labor also underwent modifications. However, despite changes in specific task allocations, most HPUs continue to utilize the complementary labor of both men and women in their pottery production strategies.

Under the traditional division of labor, women and girls formed vessels on a revolving platter, and each woman had her particular form or vessel type first learned (*oficio*), such as ollas, griddles, miniatures, and so on. Men and boys mined, transported, and prepared the clay and fetched, ground, and mixed the glaze. Men also did much of the scraping, polishing, and finishing and were in charge of firing, packing, and selling (Fig. 6.1). In the late 1950s, regardless of whether a man had another occupation, it was expected that he would perform specific pottery production tasks: obtaining and preparing the clay and glaze and participating in polishing, glazing, and conducting the firing (Hendry, 1992, pp. 59, 71). At that time, men also incised the freehand designs of flowers, birds, and so on, usually with a nail and with no sketches or patterns to guide them. Women felt unable to do this, although they did sometimes put stamped decorations on jugs. One man told Hendry (1992, p. 117) that he had learned the designs in a school drawing class, and this may have been the source of many designs. Few women attended school at that time and did not realize that it was lack of education rather than an innate deficiency that made this task difficult for them.

By the late 1960s, the traditionally established division of labor was not immutable, and some tasks had begun to change. While it was still expected that men would dig the clays and beat the gritty clay, women might sift it. Increasingly, San Lorenzo clay was purchased from resellers, mostly village potters who mined it to supplement their incomes. Some potters also bought the gritty clay, and many were purchasing wood for firing. While men continued to spend some time polishing and also stamping or incising designs or names on pot exteriors, the changes in clay procurement had affected men's roles. With prepared glaze available in Oaxaca and in local stores, many households were freed from this laborious task, and Stolmaker (1996, p. 21) estimated that the ability to purchase it eliminated about four hours of arduous labor for each firing. Thus, men's tasks had, to some degree, diminished, and a growing number were using this free time to engage in pot forming.

By the early 1990s, more modifications to this pattern had occurred, but much still held true. Men and boys as young as 10, rarely women, mined clay and transported it by burro to the production area. However, as noted in Chapter 3

FIG. 6.1. A father and son scrape and burnish ollas.

(Table 3.2), most HPUs using San Lorenzo clay no longer mined it themselves, purchasing it from San Lorenzo Cacaotepec or from Atzompa men who mined there and transported it by truck for resale, as was the case with the few HPUs that still used San Felipe clay. Thus, mining clay had shifted to a cash occupation for some Atzompa men. Although women at times and as needed engaged in all the other tasks related to pottery production, it continued to be extremely rare for a woman to mine clay or go to the mines, and my desire to visit the mines was considered strange and improper. One informant arranged for his daughter to accompany us. Others were more comfortable when my son Donald was participating in the mine trips. As we have seen, in the 1990s all HPUs that used glaze purchased the materials already ground and usually premixed with water. This and the purchase of clay freed more men to engage in other activities, including pot forming.

**Domestic Ware**—In HPUs making these vessels, much of the traditional division of labor was maintained. Forming was almost all done by women and girls on a revolving platter. Men or older boys usually prepared the clay and did much of the finishing. Although Stolmaker (1996, p. 21) had observed men forming casseroles, ollas, and flowerpots, in my sample this occurred in only one HPU. Perhaps the decrease in the number of men forming Domestic ware was related to the increasing number engaged in the forming of Greenware and *Artesanías.*

**Greenware**—The Division of labor in these households was essentially the same as that for Domestic ware. Although a task assigned primarily to men, some women were also making miniatures in the 1950s (Hendry, 1992, p. 118), and Hendry (1992, p. 120) describes the adding of appliqué by members of the Aguilar family as an "assembly job, not an act of creation." They talked, joked, argued, and ate while they worked, and sometimes looked at magazines while their fingers added the appliqué pellets. In the 1990s, the Aguilar extended family practiced a particular method and division of labor, often dividing the forming of a piece into separate tasks, handled by different individuals of either gender. These HPUs (six in my sample) made decorative Greenware in all sizes using the hand-modeling method described in Chapter 4. One person formed the vessel, another added appliqué, figures, and so on. Each potter—women, men, and sometimes older children—worked on several pieces at a time before passing them on to another person to add figures, appliqué, and so on, something of an assembly line. By this method, they were able to produce the pottery rapidly and in large quantities, and this division of labor enabled the HPUs of this extended family to utilize the labor of members of both genders and different ages, abilities, and levels of skill to produce in volume. It also provided opportunities for the development of members' skills and for flexibility in response to market changes.

**Kick-Wheel Users**—The kick wheel utilized the labor of men in forming pottery. In the late 1960s, Stolmaker (1976, p. 192) observed that although the kick wheel utilized the labor of men, pot forming was generally regarded as women's work. Further, she noted that the rapidity with which pottery could

Fig. 6.2. A child learning to make a casserole.

be produced, as much as a gross of ollas a day, created a problem of availability of materials; thus, some who had tried the wheel had given it up. By the 1990s, a solution had been found. In those HPUs where men were forming the pottery, women usually did much of the clay preparation (i.e., soaking, beating, sieving, and mixing). The scraping, application of handles and decoration was often done by women and girls. The ability to purchase glaze changed those tasks. While mining clay continued to be a task for men and boys, of the eight kick-wheel HPUs in my sample, only three mined and used *laguna* clay, and two of these had sons who shared the task. The other five purchased San Lorenzo clay.

**Children**—Children are involved in pottery production from an early age, observing, learning, and participating as they are able. Toddlers learn not to touch or damage pottery, sometimes being given a damaged piece as a toy. In HPUs producing small items, children as young as four may assist in the endless tasks of moving pieces from place to place as they are formed and dried and handing them to the person in charge of loading, glazing, and so on. By age 10, children help move clay into the sun as it is drying, or away from rain showers, and they participate in beating the gritty clay and sieving the soaked clay. The application of glaze was an activity participated in by all family members old enough to do so, although after the publicity about the dangers of lead one mother told me she was not allowing her children to

Table 6.1. Composition of household production units (HPUs).

| Family type | Totals |
|---|---|
| Nuclear families | |
| With minor children | 12 |
| With teens | 4 |
| Without children | 3 |
| Total nuclear families | 19 |
| Extended families with male head | |
| With grown married sons | 5 |
| With grown unmarried daughters | 6 |
| With grown married daughters | 9 |
| With productive elderly parent | 1 |
| Total extended families with male head | 21 |
| HPUs without adult male present | 4 |

handle the glaze. In some HPUs, children began to learn forming techniques around age 10.

Most Atzompa potters learn the pottery skills as children, observing and participating as they grow (Fig. 6.2). Instruction is mainly verbal, similar to that described by Deal (1998, p. 27) for the Maya community of Chanal. Hendry (1992, pp. 100–105) noted that girls learned the forming of Domestic vessels from women but that boys, then more often in school, were less involved in pottery production. However, my observation was that boys participated in the male gender role activities of fetching and preparing clay, scraping and polishing vessels, collecting fuel for first firing, and, when old enough, assisting with firing (Figs. 4.13, 4.16). In the 1990s, more girls attended school, but although school attendance may have reduced the amount of time school-age children participated in pottery production activities, in most HPUs both genders continued to be involved when not at school. Learning while young in the household context is an effective way of transmitting the skill and provides additional labor for the HPU (Arnold, 2008, pp. 42, 79).

**Women**—Changes in clay and glaze procurement also made it more possible for women to function independently. While men traditionally mined clay, prepared glaze, built and maintained kilns, and were in charge of firing, by the 1990s, in HPUs where male participation or support was not available, women could and did purchase both clay and prepared glaze and were thus able to handle these aspects of pottery production. Nevertheless, firing remained problematic. Some women in households without adult male participation sold their ware unfired to other HPUs; others fired themselves or sought assistance and mutual collaboration from nonresident male kin. Their choices were related to the size and volume of their pottery and their skills, physical strength, and ability to maintain good relations with kin. In addition to the four woman-headed households in my sample (Table 6.1), there were two households where men were present but did not participate in firing. One sold its ware unfired to siblings. In the other, the woman fired herself with uneven results. There were no HPUs in my sample that did not include women as participants.

### Selected Household Production Units

Selected Household Production Units in my sample are described below. They exemplify the varied composition of potter households and the range of production choices made by Atzompa potters. (Table 6.2).

TABLE 6.2. Methods of production used by HPUs in 1992.

| Using | Number |
|---|---|
| Revolving platter | 27 |
| Hand modeling | 16 |
| Kick wheel | 8 |
| Molds | 5 |
| More than one method | 13 |
| Hand and revolving platter | 4 |
| Hand and mold | 3 |
| Kick wheel and revolving platter | 3 |
| Hand, revolving platter, mold | 1 |
| Kick wheel, hand, mold | 1 |
| Kick wheel, revolving platter, hand | 1 |

GREENWARE PRODUCERS—Jacinto Olivera y Juarez and Juana Olivera García introduced me to pottery production in Atzompa and shared their home with me. Jacinto, then in his late 60s, and his brother Manuel introduced the kick wheel to the town in the 1950s (Fig. 4.6). Juana, in her late 30s, married Jacinto when she was 14, and he was a widower with three daughters. In 1989, this HPU included son Felimon, age 14; daughter Gudelia, age 10; and an infant son who died of convulsions in 1991. Felimon was also subject to convulsions and was seriously ill several times during my study. An older boy had died previously of this condition, perhaps related to lead toxicity.

This HPU produced Greenware in large volume—coffee mugs (FMNH 339181, 339182), candlesticks (FMNH 339156), vases (FMNH 339157), jugs (FMNH 339146; MST 49), small ollas with handles (FMNH 339154), and mortars in the shape of pigs (FMNH 339176)—formed on the kick wheel using *laguna* and black gritty clay and firing weekly. They sold this pottery on the street at the *Abastos* market. Except for some half-glazed jugs and ollas, all the ware was fully glazed, often with incised or stamped designs on the surface, sometimes with the words "Oaxaca" or "*Recuerdo de Oaxaca* (Souvenir of Oaxaca).

Jacinto mined *laguna* and black gritty clays himself, making a trip to the *laguna* mine each week and to the gritty clay mine less frequently. He would leave around 6:00 A.M. and transport the clay by burro. A few times Felimon went in his place, but the clay he dug was not always up to his father's standards (one sample of black gritty clay proved anomalous on INAA analysis, and on consulting my field notes I saw that the sample was brought from the mine by Felimon and rejected by Jacinto as unsuitable). The soaking and sieving of *laguna* clay was done by Juana and her daughter. Juana and Felimon beat the gritty clay (Fig. 3.6), and Juana or Gudelia sieved the powder (Fig. 3.7). Juana and Gudelia, when older, kneaded the powder into the soaked clay and wrapped the clay body in plastic to keep it moist until it was used. Jacinto did most of the forming on the kick wheel. However, he was interested in teaching the skill to other family members. His son, his wife, and a granddaughter who lived with the family in 1992–1993 all learned to make small vessels, mortars in the shape of pigs (FMNH 339183), and small casseroles. These were thicker walled than those that Jacinto made, and none of the others produced very many.

When the vessels were partially dry, Juana applied handles on those requiring them. The two adults added decoration to the pieces when they had become leather hard. Although Jacinto sometimes purchased glaze from the cooperative, most weeks he made a trip to the city to purchase it from the Oaxaca vendor. At times, he added extra copper oxide that he purchased dry from the cooperative or the Oaxaca store, saying that it made the green color stronger.

They fired weekly on Thursdays and Friday—one or two bisque firings and two or more glaze firings. Since the HPU did not own farmland, getting fuel for the bisque firing required taking the burro to common lands, sometimes a trip of several hours. At times, wood for the glaze firing was purchased by the truckload; at other times, it was bought by the kilo from neighbors. Often extended family members brought a few pieces of pottery, usually on shares, to add to the kiln load, and these people also assisted in unloading the glaze firing. The identities of the participants varied from year to year, depending on how congenial the relationships were at a particular time.

After the pottery cooled, it was counted and packed into baskets for pickup by a truck that arrived around 4:00 A.M. Saturday morning to take it to the *Abastos* market. Around 6:00 A.M., the adults and young children took the bus to Oaxaca, arriving early to get a good location on the street. Many sales were wholesale to traders, some local and others from elsewhere in the Valley of Oaxaca or the mountains of the Mixteca. The nonlocal traders brought trucks or vans to the parking area near the street stalls. They generally purchased pottery in lots of a dozen or gross (12 dozen). Sales of several dozen coffee mugs, at times a gross or more, were common. Some sales were in fulfillment of advance orders, and others sold on the spot. Sales were also made to the stalls inside the *Abastos* market or in the section of small stalls (*Galeria*). Retail sales of a few pieces sometimes occurred but were a minor part of the trade. This HPU tried to sell all its weekly production. However, if no acceptable offers were received by mid afternoon, they would leave unsold pottery in the stall managed by Juana's youngest brother, and someone would come back midweek to make additional sales. At times, this brother would buy some of their pottery for resale.

Some examples of weekly production in 1991:

May 4

2 gross coffee mugs
22 dozen pig-shaped mortars
2 dozen casserole bowls (made by Juana)
9 dozen small jugs
6 dozen (2 gross) medium jugs
6 medium ollas (by Jacinto's adult daughter, María)

May 11

32 dozen candlesticks
12 gross coffee mugs
2 large and 6 small casseroles from daughter María

Juana's parents lived nearby with their unmarried youngest son and daughter. Both her mother and youngest sister, Gloria, sometimes added pottery to the kiln load and helped unload the glaze firing. Her mother, Merced, made half-glazed casserole bowls (FMNH 339166) on a revolving platter. Her father, whose *oficio* had been miniatures, was too frail to participate in pottery production. In 1991, a grandson lived at this HPU and mined clay for them, but after he left in 1992, there was no longer a household member to dig clay for Merced's casseroles, and she ceased to make them. Instead, she managed the stall in the *Abastos* market, referred to above, operated in 1990 and 1991 by her youngest son. Gloria also made casseroles and flowerpots (FMNH 339216, 339217), but after her nephew left, she switched to small Greenware vases

using the hand-molding method (MST 56) (Fig. 4.3). This ware, which was her *oficio*, required less clay, and she was able to buy the amount she needed.

Another of Juana's brothers lived next door. In 1989 and 1992, his wife brought her half-glazed ollas and casserole bowls to be fired on shares at her sister-in-law's HPU. In 1992 and 1993, they used his parents' kiln. After the deaths of his father and mother in 1993 and 1995, respectively, he built his own kiln. By 1995, he had acquired a kick wheel and had given up farming to spend more time in pottery production.

In 1991, Felipa, one of Jacinto's grown daughters, lived in his household while separated from her husband. She made jugs on a revolving platter. While living at her father's HPU, she used clay provided by him and participated in the pottery production tasks of the household, glazing and firing her jugs on shares. His other two grown daughters lived nearby with their families. Both visited frequently and often helped with the unloading of the glaze firings. Reina worked as a seamstress but learned to use the kick wheel. María made casseroles and ollas on a revolving platter. Her HPU did not have its own kiln, and she brought her unfired pottery nearly every week to fire on shares in her father's kiln. In the early years of my study, her husband had alcohol problems and was reported to do little except sell water carried from the well. Later, he acquired a burro and mined clay, selling it to other HPUs as well as providing clay for his HPUs produetion. In 1993, María began to make green glazed salsa bowls ornamented with birds. She reported that she had seen them in the market, got one to copy, and taught herself. The first were heavy and rough, but the quality gradually improved.

In 1995, Jacinto sold his house in Atzompa and moved to a plot in the Colonia Gueleguetza, a residential section in the Atzompa common lands along the road to Oaxaca City. His kick wheel went to his daughter María, who learned to use it and began making coffee mugs. In January 1996, she refused an order for casseroles, saying that she did not have time. By then, her husband had built a kiln, and their older daughter was making salsa bowls with birds, forming the bowls on the wheel, the birds by hand. Reina, who lived next door, also used the wheel, and for a while Jacinto came weekly to make candlesticks and jugs from clay mined by his son-in-law. His granddaughter decorated some with appliqué, leaving them unglazed (FMNH 339147).

The changes in production in these HPUs relate mostly to changes in the composition of the HPUs as members aged and died or matured into fully produetive adulthood. However, the difficulties and concerns about the market for lead-glazed Greenware were faetors in Jacinto's decision to retire, and the increased atmosphere of openness to trying new *oficios* encouraged his daughter to learn to make salsa bowls ornamented with birds and to learn to use the kick wheel. Such changes in both family composition and in the market for pottery also affected the choices made by HPUs described below.

Ofelia Aguilar Sargosa was four years old and the youngest child in the Aguilar family when Jean Hendry lived with that family during her fieldwork in the 1950s; she is Hendry's goddaughter. Ofelia never married and lived with and cared for her mother until the latter's death in December 1991. Although she was the only member, it was a fully functioning HPU, producing Greenware and later some *Artesanías*. She cooperated closely, however, with the HPU of her nephew, Casildo, next door. Ofelia used San Lorenzo and white gritty clay that she purchased and prepared herself, forming censers, fruit bowls, and round and oval salsa dishes (MST 106) on a revolving platter, ornamenting them with appliqué. In 1989, she began learning to use a kick wheel, gradually becoming more proficient in this method. Her kick-wheel production included coffee mugs and small vases ornamented with appliqué (FMNH 339158; MST 54, 55). She experimented with combining the techniques, forming the base of a fruit dish on the wheel and the top on the revolving platter. Ofelia Aguilar was the only woman member of the glaze cooperative. She purchased the raw materials for her glaze there, mixing it in the family glaze mill. Her kiln was built by her brother, but when an arch fell, she repaired it herself, commenting that she used it and thus should fix it. Although she had her own kiln, firing was usually done in conjunction with her nephew's HPU, either in her kiln or in theirs (Fig. 4.17). Scheduling, although reported to be every two weeks, was less regular. Weather, illness, production factors, and the need to fire special orders caused delays and led to flexibility in scheduling.

Sometimes her sister Francesca added her pottery to the kiln load. Except for providing truckloads of clay every two or three months, Francesca's husband did not participate in pottery production, and the HPU did not have a kiln. She used a revolving platter, *laguna*, and white gritty clays to make Greenware vases, pitchers, salsa bowls and spoons, fruit baskets, and compotes ornamented with appliqué. From the time of her marriage in the 1960s, she had fired on shares with Ofelia or at the HPU of her elder sister, Lupe.

Ofelia's four grand nephews and nieces and the children of a brother who lived nearby spent much of the time they were not at school at her house and patio, playing ball, watching her work, and doing small tasks. They ran errands, fetched tools, and moved pottery around as it was being produced, dried, glazed, or loaded into the kiln. The eldest grandnieee had begun to learn kick-wheel production.

After the death of her mother in December 1991, Ofelia's nephew, Casildo, and his wife, Alejandra, sometimes joined her in forming pottery, working side by side with her in her house as they formed their Greenware by the hand modeling method. Their pottery was small in size: salsa bowls, napkin holders (FMNH 339213), and ashtrays, the latter sometimes ornamented with beautifully made animal figures. Alejandra made the bases or bowls, usually by hand, but occasionally on a revolving platter. Casildo hand modeled the animals and attached them (Fig. 7.1), and she formed and attached the rests for cigarettes. At times, the older children attached the rests.

Much of Ofelia's production was for special orders. Sometimes she delivered the orders directly to buyers in Oaxaca City; at other times buyers came to her house. She also sold at regional fairs once or twice a year. Prior to her mother's final illness, she had operated a shop in her house and purchased the pottery of other HPUs to stock it. She did not find it necessary to sell all her ware when prices were low and would reserve some for times when production was more difficult and she could get a better price. The Aguilar extended family owned a large stall in the *Abastos* market and could store baskets of unsold pottery securely inside the fenced area. Ofelia shared half with her nephew's HPU. In 1995, the HPU of a brother gave up its separate stall in another part of the market to share the space with the HPUs of Ofelia and her nephew.

The other half of this large stall was occupied by the HPU of the eldest Aguilar sister, Guadelupe, and her husband, Juan, the parents of Casildo. That HPU produced a large

volume of appliqué-ornamented Greenware. This extended family HPU included the senior couple in their 70s, two daughters, two sons, and their wives and children. The daughters and daughters-in-law formed salsa bowls in several styles, sugar bowls, mugs, and vases, using the hand-modeling method and working in the assembly line manner described above. They worked rapidly, often reading or watching TV as they formed the balls and disks, and appliquéd them to the vessels. The eldest son, his wife, and children lived at the other side of the yard and also made Greenware. He was one of the few potters in my sample who dug San Lorenzo clay himself. He built and maintained the two kilns located in the yard between his house and the parental one, and his HPU fired jointly with that of his parents. Although no longer forming pottery, the senior couple continued to play roles in pottery production. Juan went several times a week to the stall in the *Abastos* market and at times to other regional markets. Lupe was often engaged in preparation of both San Lorenzo and white gritty clay that they bought because "we do not have a burro." She also sold or bartered pottery with itinerant vendors who came regularly to purchase from the supply kept in a corner of the veranda. The buyers were most likely to come to the house on Tuesdays and Fridays, the days of the Atzompa street market.

Firing was done weekly on Thursday and Friday and every other week during the rainy season. The volume required several kiln loads, and sometimes both kilns were used simultaneously (Fig. 4.14). Bisque firing was done in the larger kiln, the smaller one used for the glaze firing. Twenty kilograms of glaze were used per firing, purchased from the cooperative. In addition to the pottery of sister Francesca, who was sometimes asked to make specific items, the pottery of other HPUs was also fired on shares. Usually these were pieces that were larger than the Greenware they produced, and the pieces were placed on top of the smaller ones to achieve a better firing result.

The focus of this HPU was on large volume and rapid production. One firing in 1991 included the following:

3 dozen salsa bowls
2 dozen vases
3 to 4 dozen appliquéd jugs
3 to 4 dozen salt dishes
3 to 4 dozen divided salsa bowls
3 to 4 dozen 8-inch vases
4 dozen 5-inch vases

From sister Francesca:

3 dozen salsa bowls and mortars
2 large vases
2 fruit bowls
2 bowls in shape of a pig

From a neighbor who came because her sister was not firing:

3 dozen mortars
1 dozen ollas
2 dozen bowls

Of these 6 dozen vessels, the Aguilar HPU acquired 4 dozen on shares.

Attitudes toward change and willingness to experiment and innovate varied among the HPUs of Aguilar extended family. In 1991, Ofelia did not look favorably on the *Union de los Artesanos*, whose founder was Mario Enriques Lopéz. One of the Aguilar sisters had married into the Enriques Lopéz family, which then began to use the appliqué technique and some of the vessel types made by the Aguilar family. The Aguilars resented the Enriques Lopéz family for copying what they felt were their *oficios*. However, after the reopening of the *Mercado de Artesanías* in 1993, with its broadened base of membership, Ofelia and her nephew, Casildo, acquired a stall and began to produce *Artesanías* that were unglazed or ornamented with slip or glazes in colors other than green. Casildo began to make his small animals free standing and unglazed or differentially colored. In contrast, the HPU of sister Lupe continued to make only Greenware, asserting that "the people at the *Mercado de Artesanías* are wrong. That is not Atzompa pottery. Atzompa pottery is green."

As with HPUs that produced more than one class of ware, some practiced more than one method of production. The different members of one successful extended family HPU, the Velasco family, used three different forming methods—kick wheel, revolving platter, and hand modeling—in the production of Greenware miniatures. René Velasco, the man who motorized his kick wheel, and his son Roger used kick wheels to make Greenware miniatures. Roger's wife made salsa dishes on a revolving platter, and one of René's daughters hand modeled salt dishes. Antonia, René's wife, made the HPU's saggers on a revolving platter. She also prepared clay and added handles to the miniatures that her husband formed on the wheel. Roger prepared his own clay, and his wife did the finishing. Each man was in charge of firing the pottery he produced in the kiln they shared. This HPU shared a stall in the *Abastos* market with René's elder son, Roberto, who produced the same type of ware on a kick wheel and lived in another part of the town. His wife, Enadina Vasques Cruz, is the sister of Angelica Vasques Cruz, described below.

Domestic Ware Producers—The HPUs just described were making mainly Greenware. Below are several examples of HPUs that produced primarily Domestic ware.

Francisco (Chico) Pérez and Natividad Ruiz, a couple in their 40s, led an HPU that produced a large volume of half-glazed casseroles in several sizes. Their household included an adult daughter, four younger daughters ranging in 1991 from ages 6 to 16, and two teenage sons. Chico's mother, in her 80s, lived with the family and made ollas until her death in 1994 (Fig. 4.1). In 1991, the HPU began to make salsa bowls ornamented with birds, a new *oficio*. By 1995, they were making fewer half-glazed casseroles, claiming that the market was down, and were fully glazing the ones they made while producing a greater quantity of the bird-ornamented salsa bowls. The latter were made and sold on special order. Natividad reported that she could make two or three dozen casseroles in the time it took her to make a dozen salsa bowls since that was a new *oficio* for her.

With the exception of one son who worked in a store, all the members made pottery, even the smallest. Natividad and her grown daughter made large casseroles (FMNH 339190). One teenage daughter made medium ones (FMNH 339191) and shared selling tasks with her father at a street stall in the Abastos market. She also went with her sisters to sell casseroles in the Tuesday and Friday Atzompa street market and at times to regional markets. The youngest, who was learning to make small casserole bowls, preferred pottery to

going to school and often stayed home (Fig. 6.2). In contrast, her next older sister did not like making pottery, enjoyed school, and was progressing well there. However, she sometimes modeled bird-ornamented salt dishes (FMNH 339184) and when older assisted with selling. In 1991–1992, the eldest son was working in Oaxaca, making small animals from the clay of San Bartolo Coyotepec, but by 1993, he had returned to Atzompa and was making salsa bowls.

Formerly, this HPU had used San Felipe clay but by the 1990s was using *laguna*. Colored earth, in amounts equal to white gritty clay, was added to give color to the half-glazed casseroles. Chico dug both *laguna* and colored earth but purchased white gritty clay annually by the truckload. With three burros, he could bring back three loads of *laguna* clay at a time, thus reducing the number of trips needed to provide clay for the large volume production. He prepared all of the clay, although at times other family members shared the task. He also scraped and polished the pottery, and his daughters incised any decorations. They fired weekly in two kilns. Glaze, 20 kg per week, was purchased from the cooperative.

Example of a week's production in 1991:

24 dozen casseroles (2 gross)
12 dozen bird salsa bowls (1 gross)
30 ollas made by the grandmother

There were distinct changes in the production strategies of this HPU, as not only clay sourees but also market demands shifted. Prior to the 1990s, not only were these potters adding colored earth to *laguna* clay to replicate the fired color of San Felipe clay, but during my study period they shifted from producing mainly half-glazed casserole bowls to including bird-ornamented salsa dishes in their repertoire. Although very traditional in many ways, this HPU showed flexibility and willingness to try a new *oficio* and to take advantage of abilities and inclinations of younger members to do so.

Large basins (*apaxtles grandes*) were made by two HPUs in my sample. The members of one, a childless couple in their 50s, Pedro Olivera and Tomasa Olorio, used San Felipe and white gritty clays, both purchased by the truckload. In 1993, Pedro became seriously ill, and after his death, Tomasa's niece and her husband and children came to live with her and participate in the production of the large basins.

The other HPU making large basins was that of Felipe Torres and Adelina Vasquez, their three sons and daughter (all in their teens), a sister-in-law, and Adelina's mother. Adelina made basins in several sizes from San Lorenzo clay and the special gritty clay used for these vessels (Fig. 4.2) (MST 33). Her sister-in-law made flowerpots using *laguna* clay. Adelina's mother was no longer able to work. Felipe went to clay mines several days a week with three burros but sometimes also bought San Lorenzo clay. They bought gritty clay by the truckload in the dry season. With his sons, Felipe prepared the sizable amounts of clay required for these large vessels. This HPU also bought pottery from other HPUs and sold it from a shop in a vacant house next door that it owned. It also bought glaze from the Oaxaca shop for resale. Most of the large basins were made for special orders. Adelina's skill in forming and Felipe's in firing (Fig. 4.17) resulted in little breakage and a reputation for high quality.

Active in the development of the *Casa de los Artesanos*, they continued to be very involved in the *Mercado de Artesanías*, contributing time, cash, and leadership to that project, where they had two stalls. During the later years of my study, this HPU was shifting from making mainly half-glazed large basins and glazed or red-slipped flower pots to the production of *Artesanías* (Fig. 2.2). These, usually griddles, basins, and tall jars (MST 101), were ornamented with appliquéd and incised figures and designs painted with colored glazes and white slip (Fig. 2.2) (FMNH 339200; MST 128, 136, 137). In 1995, the sons were participating in the ornamentation.

Gudelia Pérez Olivera and Abel Ruiz Juarez made prize-winning ollas (Fig. 4.1) (MST 118), and their kiln construction was described in Chapter 4 (Figs. 4.12, 4.13). This nuclear family HPU consisted of the parents and two teenage sons. The elder son, Francisco, was employed by the forestry department in 1991 and earned enough to buy a truck by 1995 while still in his early 20s. Abelito progressed well in school and entered the university to study architecture in 1996. This HPU followed the traditional division of labor. Abel dug and prepared *laguna* and white gritty clay (Figs. 3.2, 3.3) and was in charge of firing. He and his sons scraped and polished the ollas (Fig. 6.1). They were sold to a trader who contracted for them and came to the house on a regular schedule to collect the ollas for sale at the regional market in Ocotlán (Fig. 5.2). All stages of this HPU's production were conducted with meticulous care, resulting in a high-quality product. Firing, although reported as biweekly, was frequently rescheduled because of weather, fiestas and other work, which was often farmwork. In addition, at times during my study, Abel was employed as a laborer outside the town and was unable to dig and prepare clay, and at these times pottery production was curtailed.

This HPU was one of the few from the upper section of the town that was active in the *Union de los Artesanos* and involved from the start in the *Casa de los Artesanos*. Although Delia experimented with appliqué on an olla as early as 1989, her buyer was not interested in purchasing it, and she did not continue this technique. However, as the 1990s progressed, the difficulties and concerns about sales of lead-glazed cookware impacted this HPU strongly. Although initially denying the problem, by 1994 they were no longer selling to the Ocotlán trader. That year, Delia was selling unfired ollas to an HPU that purchased vessels to ornament as *Artesanías*. In 1995, the HPU was making *Artesanías*, small ornamented ollas (MST 129), and appliquéd crosses and had built a new, smaller kiln to fire this ware. Delia was also buying the pottery of other HPUs for her stall in the *Mercado de Artesanías*.

WOMEN-HEADED HOUSEHOLDS—Women-headed households without adult male participation in pottery production had several strategies for making pottery.

Dominga Olivera, the widowed eldest sister of Jacinto, headed an HPU that produced Greenware, fully glazed traditional forms, mortars, casseroles, censors, and appliquéd jugs. Members included Dominga's daughter-in-law and her five children. Dominga's son had worked on a kick wheel but had returned sick from working in California in the 1980s and died several years later. These women used *laguna* and white gritty clay that they bought monthly by the truckload. Dominga's daughter-in-law and two teenaged girls all formed the pottery on revolving platters. With Dominga, they added feet and handles and scraped and polished the pottery. They preferred glaze from the cooperative but sometimes bought it in Oaxaca and fired weekly, using wood for both firings since there was no man to get other fuel for the bisque firing. This HPU made and sold its ware on special order and in the

Atzompa and Oaxaca street markets. Volume was substantial; a gross of mortars could be produced in a week.

Angelica Vasques Cruz is a very creative and successful maker of *Artesanías*, small, delicate appliquéd figures, the natural buff color ornamented with red slip. At the time of my fieldwork, she had already won prizes and gotten high prices for her pieces, some of which are in museum collections (Wasserspring, 2000, pp. 66–76). She purchased two burro loads of San Lorenzo clay and three of white gritty clay every two and a half months. The strategy of using natural clay color ornamented with red slip made only one firing necessary. The small size of the pieces and the high return per piece made this a successful strategy; she made her pottery only for special orders. During my study period, Angelica was in her early 30s, with four school-age children; her husband had gone to the United States some years before and never returned. She came from a talented family (Rothstein & Rothstein, 2002, pp. 21–26). Her father and mother, in their 70s, continued to produce *Artesanías* of high quality (MST 105) as well as flowerpots with animal figures (MST 134). In the late 1990s, her sister, Enadina Vasquez Cruz, achieved equal renown as a maker of *Artesanías* (Fig. 6.3 ) (MST 104).

Mentioned above was a household in which a man was present but chose not to participate in pottery production; members were Manuel Lopéz and Sara García Marques, a couple in their 50s with three grown unmarried daughters, the youngest in her late teens in 1991. This HPU made all three classes of ware and was already producing *Artesanías* in 1990. They bought clay, both San Lorenzo and *laguna*, and white and black gritty clay. Sara's *oficio* was casseroles, and she continued to form these on a revolving platter, along with bowls and tall jars. The elder daughter, Luci, made salsa bowls and ashtrays on a revolving platter, ornamenting them with birds and appliqué. These were fired as fully glazed Greenware and produced on special order for markets as far away as Japan. The youngest daughter, Estella, also participated in this area of production. Justina, the middle daughter, talented and creative, benefited the HPU by making figures in various sizes up to a meter in height (FMNH 339122; MST 30). She ornamented the vessels made by her mother with flowers, fruits, and animals (FMNH 339208, 339209; MST 117).

Other members of the HPU allowed her the time to work slowly and carefully and she often spent many hours in the production of a single piece that subsequently brought a good price. Although trained in bookkeeping, she claimed she earned more making pottery (Fig. 4.6).

Sara usually fired the pottery herself. However, both firing and kiln maintenance was a problem, particularly for the large figures and vessels. Although there were two kilns, in the early 1990s only one was usable, and this kiln (106 cm in diameter) was not large enough to fire big figures and vessels well. Breakage occurred, and incomplete firing resulted in brittle pottery. In the early 1990s, the HPU sold its ware to specialty stores in Oaxaca and on special order. During the first two years of my study, they also had an inside stall at the *Abastos* market but gave it up, believing that it was not cost effective relative to the other outlets. Sara was an early member of the *Union de los Artesanos* and the *Mercado de Artesanías*, her brother-in-law, Mario Enriques Lopéz, being the founder of the *Union*.

These potter households represent the range of HPU composition, choices of materials, forming methods, and marketing strategies. They show the diversity of ways in which HPUs select from the palette of options available.

FIG. 6.3. *Artesanías* figure made by Enadina Vasques Cruz.

**Continuity and Change**

In the previous chapters, we examined change in the town and in pottery forms, materials, methods of production, and marketing strategies. In this chapter, we have looked at the changes that occurred in pottery production at the household level. Changes in the manner of procuring both clay and glaze substantially affected gender roles and the division of labor. The option of purchasing these materials freed men from those arduous tasks and enabled more men to engage in forming pottery, primarily Greenware and *Artesanías*. Although the kick wheel had been introduced in the 1940s, the capacity for rapid production resulting from its use had created a problem of materials supply that discouraged its spread since men were both the users of the wheel and the suppliers of the clay. By the 1990s, along with the option of purchasing clay and glaze, a shift in gender roles had occurred that made it possible for use of the kick wheel to expand. In those households in which men produced Greenware on kick wheels, women had taken over the tasks of clay preparation and much of the finishing, scraping, adding handles, and decoration, although men were still responsible for firing the pottery, thus making it possible for these households to produce vessels rapidly (see Table 4.1) and in large volume.

Along with the changes in women's roles in kick wheel–using households, there were other changes affecting women. Girls were receiving more education than in the earlier periods, although they continued to participate in pottery production when not in school, as did boys. Another effect of the option to purchase clay and glaze was that women were able to be productive in households without a man present or involved. Although able to purchase clay and glaze, firing remained an issue in those households, and the strategies that women developed to address it included selling their ware unfired, producing small and/or unglazed ware and firing in small kilns, and cooperating with extended family members for assistance in firing.

## CHAPTER 7: INNOVATION AND CREATIVITY

### Innovation

Innovation or acts of cultural creativity can be viewed on both an individual and a group level. There are three stages—invention, acceptance, and adoption—and they can occur from sourees internal or external to the community. In Santa María Atzompa, innovation and change came from both directions, and it occurred in materials, technology, forms, styles, and marketing techniques, that is, in both technical and social contexts. Some innovations were driven by the availability of new materials and/or opportunities, others by the diffieulties in obtaining former materials, still others by market forces. Some were tried but neither accepted nor adopted by the community, while others were aceepted and practiced by one or several HPUs, their widespread adoption or rejection by the community not yet proven. Some externally developed innovations also had effects on pottery production.

Lemonnier (1992, pp. 84–95, 1993, p. 13) points out that the current structure of a technical system can produce an innovation but that, in order for it to be inserted into the system, it must meet certain requirements; it must be consistent with the current technology, that is, be understandable and suitable and also at the same technological level. In addition, there must be a need for improvement or change; thus, the innovation must be both needed and manageable. Innovations introduced or borrowed from outside have to find their place in the system in order to be aecepted, and this model can apply as well to forms and styles. Some innovations in Atzompa pottery production met the requirements and were adopted; others, such as gas or kerosene fired kilns, did not. There can also be a time factor; a previously unknown innovation does not generally fit into the system immediately; it has to be "locally deciphered" (Lemonnier, 1993, p. 15). Such was the case with *Artesanías*. It took some years for the category to be recognized; neither Hendry nor Stolmaker used the term, but by the early 1990s, my informants, speaking of another potter, would tell me that she or he "makes *Artesanías*." The *Artesanías* class was, by then, considered a recognized category; it had found its place in the system and, as we have seen, had increased in numbers of producers and volume of pottery.

Innovation in Materials and Techniques—There were a number of innovations in materials and techniques tried by Atzompa potters during the latter part of the 20th century, both externally and internally derived.

**Externally Derived**—An important element, as we have seen, was the change in materials procurement. The availability of commercially prepared green glaze in the late 1960s and the purchase of clay through middlemen, while largely the result of utilization of intermediaries rather than technical innovations per se, saved approximately four hours' time in grinding and mixing and thus freed male labor for other activities (Stolmaker, 1996, p. 21). Another shift in materials procurement was caused by the need to find an alternative source of fuel for kilns when local firewood became unavailable. This led in the 1990s to the purchase of trimmings from a sawmill in Etla, and these 2.5-m lengths provided a new building material for sheds and fences. Other fuel innovations by two HPUs in the creative and innovative Aguilar extended family included the use of rubber tires for first firing and of gasoline for starting fires. However, neither of the last two innovations was generally adopted, perhaps because they did not meet a specific need or seem suitable, but both took advantage of externally developed technical inventions.

The presence of concrete floors in some houses changed the methods of those potters who used revolving platters set on upturned ollas. Instead of burying an olla in the ground, a potter set the rim directly on the flat floor, an adaptive change to a modification in house structure. As noted in Chapter 4, Hendry (1992, p. 84) reported the use of a disk rotating on a fixed axis used by a male pot former to make flowerpots, and Stolmaker (1996, p. 25) noted it being used in the late 1960s by this man's son and two unrelated women. Most likely, this innovation was the ball-bearing disk (*tornillo*) that I observed in the 1990s. It appeared to have spread slowly since it met some needs and was sufficiently understandable and consistent with the revolving platter technology. Four of the 27 potters in my sample who formed their pottery on revolving disks were using ball-bearing disks in 1991, and a fifth aequired one in 1995. All reported that they had purehased the device in Oaxaca City, and all users were women making traditional vessel forms, ollas, casserole dishes, and one maker of large basins. Arnold (2008, pp. 256–262) described this innovation in Ticul, apparently an internal innovation adopted by some potters in large production units in the 1970s.

The low cost and widespread availability of plastic, a by-produet of the Mexican petroleum industry, led potters to incorporate it into their production methods. As mentioned, in the 1990s. plastic sheeting was used to eover prepared clay or clay bodies to keep them moist prior to use and also to cover pottery as it was drying, thus permitting greater control over the drying process. Plastic screening, often recycled from mesh shopping bags, was attached to wooden frames to make the sieves for sifting the gritty clay into powder (Fig. 3.9); plastic pails held clay and glaze, the latter purchased in plastic bags that were kept closed to prevent evaporation before and after use.

As discussed, the Olivera brothers began to use the kick wheel in the late 1940s. They initially acquired the wheels from outside the town and continued to work in this method. It diffused principally through the Olivera extended family, but Stolmaker (1996, pp. 25, 29) reported that only nine men in the village using kick wheels in 1969. Spread was slow until a way was found to handle the problem of material supplies. However, as described above, the option to purchase materials and modify gender roles made kick-wheel production feasible. In 1991, 21 HPUs were reported to be producing ware made on kick

wheels; some had several members working on a wheel, and two in my sample had more than one wheel. While most were related to the Olivera family, a few others adopted its use. Two were women, and by the mid-1990s, more women and girls were learning the technique. Two of Jacinto Olivera's daughters learned to use his wheel in the early 1990s, and on his retirement in 1995, one acquired her father's wheel. In 1992, there was a new innovation; a kick-wheel user purchased a motor to electrify his wheel, the first person in the town to do so.

The techniques of other pottery-producing towns can also be a source of innovation. Some Atzompa potters were influenced by the reduction fired blackware of San Bartolo Coyotepec. Stolmaker (1996, p. 31) reported that Felipe Aguilar used reduction firing to make similar ware but made it only for export. He did not sell locally, as he did not wish to offend the potters of that town, which is very possessive about its techniques (see Appendix VI). In the 1990s, several Atzompa potters experimented with reduction firing, and one HPU built a kiln modeled after the underground kilns of Coyotepec. A kick-wheel user reported attending a workshop in the early 1990s where he learned the technique of reduction firing, and he gave me a small water jar (*cántaro*) (FMNH 339178). However, he did not add this technique to his production repertoire. Another HPU fired tiny animal figures playing musical instruments in a small stone fireplace. She smothered the fire, resulting in black figures approximately 3 cm high. Still another potter requested that I purchase a particular Coyotepec figure type for her to use as a model; she subsequently acquired it elsewhere and produced the form but fired it in the oxidizing Atzompa manner. Despite these examples, reduction firing was not generally adopted by Atzompa potters; it did not become part of the Atzompa repertoire.

With the development of the *Artesanía* class, innovative use of surface-enhancing materials took on increasing importance. While a few potters had occasionally used glazes in colors other than the traditional green in the past, there had been resistance to the use of such colors. They were more costly than the lead/copper green glaze, and villagers considered green to be their "trademark," saying that Atzompa pottery is known for its green color. In the mid-1990s, this was changing, as glazes other than green and white and red slip grew in use as decorative accents in *Artesanías*. The use of enamel and tempera paint were other innovations, the latter applied after *Artesanía* ware was fired. Although these materials had been tried by at least two HPUs in my sample prior to the opening of the *Mercado de Artesanías*, teacher-demonstrators from outside the village were reported to have come to that market in 1994 and 1995 to teach the techniques to villagers, and use was growing. It remained to be seen whether they would become an established part of the Atzompa repertoire.

**Internally Derived**—Not all material and technical innovations came from outside. Already mentioned is the addition of colored earth to *laguna* clay to produce the reddish color of fired San Felipe clay, preferred by buyers of Domestic ware. This became a fairly widespread practice for HPUs making that ware, and a few makers of *Artesanías* experimented with adding colored earth to some of the clay they appliquéd. The contrasting colors of the clays served as decorative elements.

Stolmaker (1996, p. 31) reports the invention by Lorenzo Aguilar of the sagger, a round vessel with protruding nails designed to hold miniatures during the glaze firing (Fig. 4.19). By the 1990s, it had been adopted by all the HPUs in my sample who made the miniatures. Lackey (1982, pp. 72, 122) describes saggers used by potters in Acatlán that serve a similar purpose (i.e., to protect small pottery during firing); however, they were fixed in place in the kiln, had doors, and were triangular or square in shape.

In 1995, one of the miniature makers created a device for use in the nonglaze firing. This was a flat, rectangular pottery plate, about 15 $cm^2$ with perforations. Set on the grid of a small kiln that had a diameter of only 88 cm, it prevented the small pieces from falling through the grid, thus avoiding the need to use the more cumbersome ollas with perforated holes (*pichanchas*) for the bisque firing in their kiln. It remained to be seen whether it would be generally adopted.

INNOVATION IN FORMS AND STYLES—As with materials and techniques, some forms and styles came from outside the town. In the 1950s, Hendry (1992, p. 118) noted that at times some individual potters tried new forms; such were the square casserole dishes requested by a North American visitor. Another potter duplicated a form made in a Oaxaca City factory, and still other innovations were modifications of traditional forms, such as small squat jugs. Buyer preferences were at times a spur to invention. However, the success and continuation of new forms and their adoption as important components in the repertoire of Atzompa pottery was and is dependent on the demands of the marketplace. Is there demand? Do the traders like it? Requests encouraged innovation, but unless demand continued, the new form or style would not become a permanent addition to an HPU's ware or diffuse through the town. In the 1990s, none of the above vessel forms was being produced. Although not her invention, as mentioned above, Gudelia Olivera experimented with appliqué on an olla as early as 1989, but since her buyer was not interested in purchasing it, she did not continue to produce these decorated ollas. However, in the late 1980s and 1990s, makers of flowerpots produced red-slipped vessels with bird and animal forms, not unlike those made in the pottery-producing town of Acatlan, just over the border in the neighboring state of Puebla (Lackey, 1982, pl. 10). In contrast, the making of human figures became increasingly popular in the early 1990s, and the growing demand and market for *Artesanías* encouraged a flowering of innovation in the mid- and late 1990s.

During the middle years of the 20th century, two important inventions occurred, and Hendry knew both innovators. Catalina Aguilar developed the technique of appliqué (*bordado*) ornamentation and introduced many of the vessel forms that were made by the Aguilar family in the 1950s and later—vases, decanters, and some of the miniature animal forms; she also modified the miniature forms made by her father (Hendry, 1992, pp. 117–118, 121). Teodora Blanco, who was 28 at the time of Hendry's study, began making figures of animals playing musical instruments at the age of 13 and in the 1950s was making small male and female figures with which she ornamented ashtrays. At that time, human figures were rarely attempted by the potters, so she was unusual for attempting them (Hendry, 1992, pp. 53, 117, 121). By the late 1960s, Blanco's artistry had matured, and her large, unglazed female figures, elaborately ornamented with appliquéd designs of birds, fishes, frogs, and so on, had achieved popularity not only locally and nationally but internationally as well. At least four other households tried unsuccessfully to duplicate these figures (Stolmaker, 1996, p. 30). Subsequently, however, both during Blanco's lifetime

and after her death in 1980, family members learned the techniques and continued to produce figures in the style she initiated. In the 1990s, unrelated HPUs began to make them since the making of *Artesanías* was by then accepted by many potters as a legitimate Atzompa craft.

As we have seen, these innovations became important components of the repertoire of Atzompa pottery in the last half of the 20th century. The appliqué technique developed by Catalina Aguilar is an example of diffusion of both technique and style. Initially, it spread through the village into other extended families through marriage. People in Atzompa had definite beliefs about the ethics of ownership of new techniques and styles of pottery. Inventions were initially perceived as "owned" by the HPUs of the inventors, a sort of informal patent or copyright. In the 1950s, appliqué was made commercially only by the Aguilars and the households into which their daughters had married. Nevertheless, several potters from other families showed Hendry this ornamentation, albeit of inferior quality, and she predicted that if the technique diffused in this way (illegally), it would probably undergo some variations since it would be picked up and reproduced from memory rather than directly taught (Hendry, 1992, pp. 119–120). My observations confirmed that this indeed had happened. As the appliqué technique diffused through the town in the subsequent 40 years, some potters reported seeing it and experimenting with producing it on their own, and the techniques they used did indeed vary. Clearly, however, the appliqué innovation met the requirements necessary for acceptance; it was compatible with other techniques and popular with customers.

Traditionally, there were several stages in the diffusion of a new technique or style in Atzompa. For some years after its introduction, a successful innovation would be restricted to the immediate family of the innovator. Gradually, it would begin to diffuse through the town, almost always along family lines. Just as a potter was supposed to be taught an *oficio* only by relatives, so it was believed that an innovation belonged to that family and its descendants. Although not the case with forms whose origins had been lost, even the production of these items was usually acquired by birth or marriage. There were even instances when marriage was reported to have been proposed in order to gain the right to make certain types of ware (Hendry, 1992, p. 119). One result of this ethic of ownership was that when, after two or three generations, the new forms and techniques had spread through the community, some members of the extended families that originated them might feel resentment toward the new practitioners for making "their ware."

Following an invention, a trial period had to occur; if the innovation was successful (i.e., was an improvement in technique or material) or a salable pottery style or form, it would be accepted and produced or used first by the HPU of the inventor, then spread through the extended family for the first generation or two. A 1990s example of this phase was the distinctive polished incised Redware produced only by HPUs of the children of the innovator. Eventually, a successful innovation would diffuse through the town, as happened with the appliqué technique. Interestingly, in the mid-1990s, the ways in which innovations were diffused and adopted were undergoing transition. With the growing production of *Artesanías* and the increased communication between potters that was occurring in the *Mercado de Artesanías*, the use of slips, colored glazes, enamel, and tempera paint seemed to be spreading with rapidity and little feeling of ownership.

FIG. 7.1. Forming miniature animals.

Hendry (1992, pp. 117, 119) and Stolmaker (1996, p. 29) described the development of the miniature vessels and animal forms by members of the Aguilar and Olivera families during the late 19th and early 20th centuries. Each family claimed that its ancestor had invented miniature vessels or "toys" and small green-glazed animals. The Aguilars told Hendry that the forms were invented by one of their immediate ancestors and that bad feeling about this persisted between the two families about this, but after repeated questioning, she decided that Felipe Aguilar Sr. had been the first to make the miniature vessels and Joaquín Olivera the animals (Fig. 7.1). Stolmaker arrived at a slightly different conclusion, attributing the innovation of the freehand technique for making miniatures to Lorenzo Aguilar, who was taught the technique in the late 1800s by a cousin, a priest who had learned it in seminary. This innovation was economically successful, enabling the Aguilar descendants to acquire land and become more prosperous. In the 1950s, miniatures were made by 11 households, six of whom were direct descendants of Felipe Aguilar Sr., the other three related by marriage. Two of the latter were Oliveras, an alliance that had allowed the Aguilars to acquire the right to make animal miniatures.

### Creativity

In the 1950s, Hendry (1992, p. 120) reported that the level of creativity was low and that originality was not valued because, she felt, of working conditions. Pottery making was mandatory for women, and the pressure and repetitive nature

of the work did not encourage innovation. During the 1990s, however, greater latitude for experimentation, encouragement of creativity, and innovation for potters of every age could be seen. One factor in this change could have been the recognition and economic success of artisans such as Teodora Blanco. Villagers were aware of her success and national and international reputation. Although in some HPUs pressure for rapid production did not permit or encourage the spending of time to experiment or innovate, except perhaps for children who were not yet productive, in others creative innovation was permitted and even encouraged, especially when it was demonstrated that there was a market and a potential for more sales and higher prices for such ware. This, along with the decreased market for both traditional Domestic ware and Greenware and the increased demand and cost-effectiveness of *Artesanías* production, was a likely factor in the change. *Artesanía* making had become a recognized category of Atzompa pottery. It filled a need and a market niche, and I noted a marked increase in willingness and interest in trying new techniques and forms in several HPUs during the course of my study. More than once, a member of an HPU proudly showed me attempts at appliqué or new Greenware forms, sometimes made by one of the younger members, or perhaps a first or early effort at *Artesanías* by a member who had hitherto made only Domestic ware. In one HPU, a particularly talented and creative member was given time and freedom to work slowly. At nearly every visit, she had something new to show me; when asked where she had learned it, she would tell me that she had seen one and thought she would try it or that she simply thought it up and tried it. A factor in the increased willingness to permit more latitude for experimentation and creativity may have been additional sources of income that made Atzompa households less dependent on sales of pottery.

Since individuals vary in their creativity as well as in technical skills, it can be interesting to track creativity and innovation into subsequent generations of an extended family. We have looked at how a new style, technique, or *oficio* developed in one generation was transmitted to subsequent generations. HPUs of both the Blanco and Aguilar extended families continued to produce pottery in the styles and techniques of their creative and innovative forebears. In some of these HPUs, production became routinized with little creativity. They reproduced replicas of their creative ancestors' styles with fidelity but little originality. Others continued to innovate, building on the creativity of their forebears and trying new techniques or forms. Notable were the figures of Berta Blanco and Irma García Blanco, the miniature animals of Casildo Reyes Aguilar, and the Monte Albán replicas of his cousin Sergio Enriques Aguilar that he modeled from the drawings in Caso et al. (1967).

The adoption of an invention is an active social process. In Atzompa, while some innovations were adopted, others were not. These included some with external origins and others of local invention. Bargatzky (1989, p. 17) suggested that innovators are sometimes those who have been away for some time and have adopted something from a "foreign" culture. Such was the case when the Olivera brothers returned to Atzompa and introduced the kick wheel in the 1940s. Although she never left the community, Teodora Blanco had a less restricted childhood than most of her contemporaries; her mother was not a native of the town, and when she was young, she visited the Oaxaca archaeological museum and after seeing figures there came home and tried to make them (Hendry, 1992, pp. 118, 121). However, as with the kick wheel, although her innovations gradually received acceptance and implementation in a few HPUs by the early 1990s, the style began to be more generally adopted only when there was a need for a new approach during 1990s.

Torrence and van der Leeuw (1989, pp. 9–10) suggest that innovation is both a process and a choice and is related to the group's ability to deal with the problems the innovation might cause. As a process, it is going on continuously and, in some instances, will take off. In the case of the kick wheel, the division of labor in the 1950s and 1960s precluded its general adoption. With the option to purchase both clay and glaze and the shift in gender roles in kick wheel–using HPUs making it no longer necessary for men to always do these chores, the kick wheel innovation saw increased acceptance and adoption as a technology in the Atzompa palette of choices.

**Continuity and Change**

In the last half of the 20th century, there were innovations in materials and techniques, and in forms and styles of pottery. There was also an increase in the willingness to encourage and accept innovation. Materials and practices from outside the community were utilized or adapted when they were seen to be useful and fit the requirements for acceptance. Trucks brought clay and firewood to the town and took pottery from it, freeing men for other tasks. Plastics proved useful for some tasks, as did ball-bearing turntables. In the mid-1990s, new surface treatments appeared—glazes in colors other than green, enamel paint, and slips—and there were a few borrowings from other ceramic traditions, such as forms and firing techniques from San Bartolo Coyotepec, mostly ephemeral. Some innovations for firing were developed, such as the use of gasoline and rubber tires, but these did not become widely accepted. However, use of the kick wheel increased, and there was the creative addition of colored earth to clay as the San Felipe clay source played out, but the most important innovations occurred around the growth of *Artesanías* ware. Although already under way in the early 1990s, its florescence and creativity was stimulated by the concerns about lead glaze.

Atzompa potters show a pragmatic adaptability and willingness to try out new materials and techniques and styles. Some of these prove successful and are adopted into the repertoire of particular HPUs and/or the community as a whole. Others, such as the kick wheel and *Artesanías*, might remain in memory to be tried again as circumstances changed. Still others are discarded. The nature of pottery production in an environment with changeable and unpredictable weather requires flexibility in the production process. During the rainy season, the production schedule must be continually readjusted, from trips to mines, to drying and beating clay, to drying of pottery and firing. Although scheduling can be more predictable in the dry season, strong winds can necessitate rescheduling of firing times. It is possible that the flexibility that HPUs must develop to cope with these conditions is carried over, for some, into a willingness to innovate, to try new materials, techniques, forms, and styles. Economic conditions in the 1990s rewarded experimentation, innovation, and willingness to change. This is shown dramatically in the changes that occurred in Atzompa ceramic production.

# CHAPTER 8: CHOICE, CONTINUITY, AND CHANGE

## Choice

Household production units make choices related to their composition, tradition, available materials, new options, and expected outcomes. A choice by definition implies the existence of possibilities or alternatives that must be compared, an assessment made, and a determination of what the material and social consequences might be (Lemonnier, 1993, p. 7). Atzompa potters have a variety of options available for choices (Table 8.1). The structure and composition of the HPU and the age, gender, inclinations, and abilities of its members play a strong role in the options it selects. An HPU adjusts or alters its course of action when circumstances or the structure of the situation changes or when alternative options offer preferred, improved, or positive outcomes. Ortiz (1967, pp. 192–197, 219–225) looked at ways in which the results of choices can be viewed. Prospects may be sure or may be expectations, and choices may involve the evaluation of the most likely outcomes. The preferences may involve a sequence of linked outcomes, and choices are made not only on maximum return but also on minimum cost or uncertainty. Not all factors require decisions, and a producer will continue to choose traditional means until the structure of a situation changes. This last point is particularly relevant to Atzompa pottery production in the mid-1990s, when HPUs who were trying new techniques or adding new forms or classes to their repertoires continued to practice their former *oficios* or use their former methods.

In making their choices, HPUs and individual potters assess the alternatives, examine which elements can be considered changeable, and what risks, problems, and consequences should be considered (van der Leeuw, 1993, pp. 241–243). As Arnold (2008, pp. 230–231) noted, while potters' choices may be based on technological options, they are ultimately socially embedded. Some decisions are made before a task is organized (e.g., methodology, materials, and the class of pottery to be made). Other decisions are made "on the spot." These might include variations in decoration, weather-dependent decisions (e.g., when to fire or dig clay), and marketing decisions (e.g., whether to accept an offered price from a buyer or defer selling in hope of a better price). These immediate decisions would be evaluated in terms of need (for further discussion of types of decision making, see Ortiz, 1967, pp. 220–221). Some of the decisions made in advance are susceptible to modification (e.g., those that are weather dependent and where and when to sell). The potential market for pottery affects choices at each stage of the production process, and pottery methodology, materials, volume, and selling decisions are all "marketing strategies." However, other factors, including social and family circumstances and events, are also involved in decision making.

Figure 8.1 presents the interrelationships of choices in graphic form. Pottery methodology is placed at the center, indicating its relationship to the other factors. The relationships are complex, and some are briefly summarized below.

Family dynamics refers to the size and the composition of the household: whether it is a nuclear family with small children too young to participate, participant older children or teens, or an extended family with elder members still involved or not in production. Members' skills, both their learned

TABLE 8.1. Production choice strategies.

| Options | Save money | Save time | Save physical effort | Maximize quality and sale price/item | Maximum volume | Cash problems | No adult man |
|---|---|---|---|---|---|---|---|
| Materials | mine all clay<br>use *laguna*<br>buy Oaxaca glaze<br><br>buy wood by truckload<br>sell wood to others | buy clay<br><br>buy co-op glaze | buy clay | use San Lorenzo clay<br><br>buy co-op glaze | | dig clay<br><br>buy glaze on credit (Oaxaca)<br>buy fuel by kg | buy clay |
| Class | make unglazed<br>make Redware | | make small ware | make *Artesanías* | | | make small<br>make unglazed |
| Production method | | | get kin to help | spend more time/item | use kick wheel<br><br>assembly line<br>standardize production | | do own firing or get kin help |
| Market strategy | sell to traders | sell ware unfired | sell in Atzompa to traders | | sell ware unfired | sell unfired | |

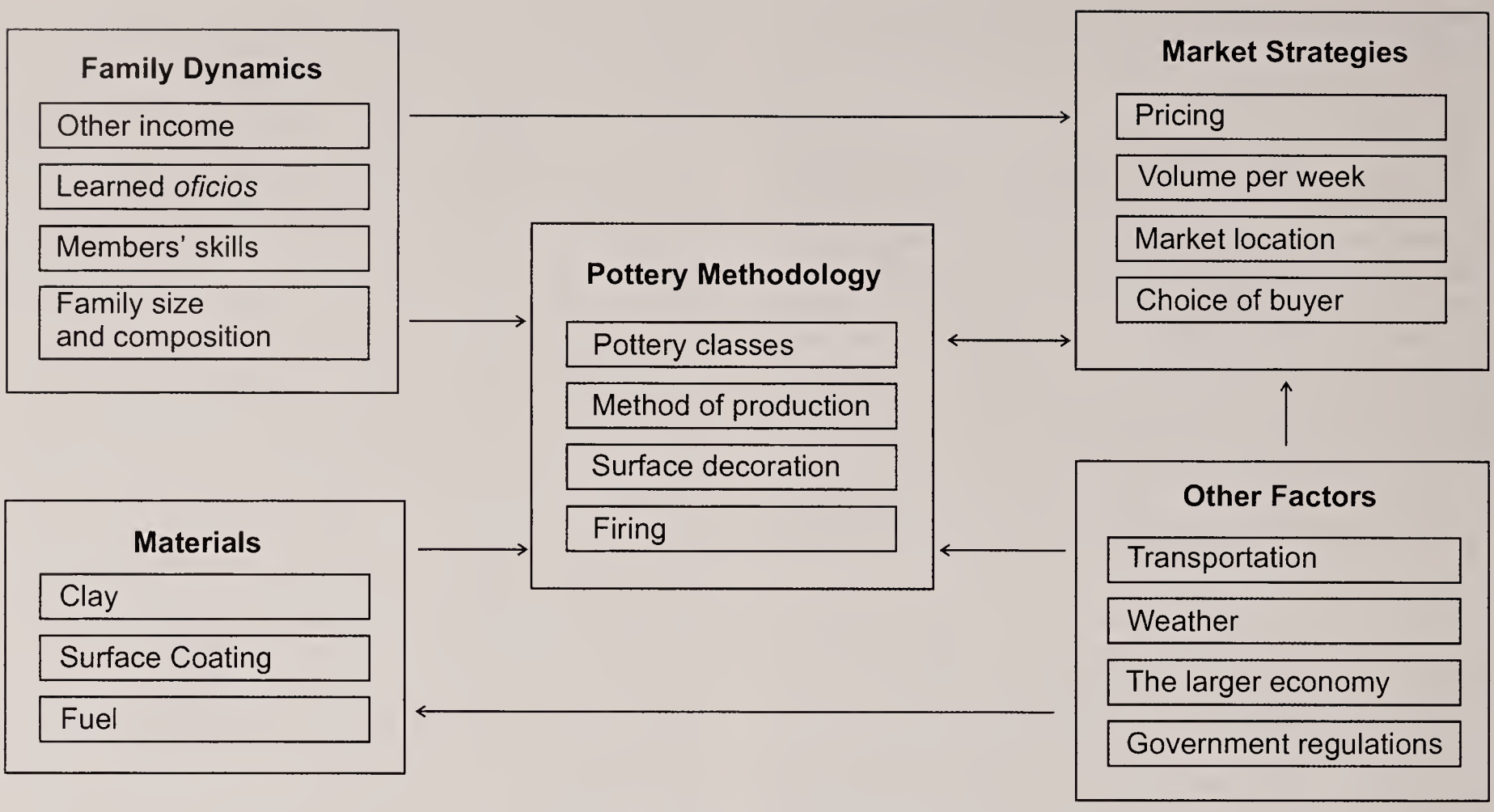


FIG. 8.1. Interrelationships of potters' choices.

*oficios* and their interest and ability to learn and try something new, affect the choices potters make, particularly in the mid-1990s. Also a factor is whether the household relies primarily on pottery production or has other sources of income.

Materials, an important area of choice, refers to the use and availability of the various clays, fuel for firing, and surface coatings. See Tables 3.2, 3.4, 3.5, and 3.6.

Market strategies affect and are affected by the class and type of ware being produced. Volume is related to method of production and pricing to class of ware and decoration, most particularly for *Artesanías*. Decisions regarding where to sell are also related to class of ware (see Table 5.3). In addition, market decisions are affected by family dynamics and the composition of the HPU. Decisions as to where and to whom to sell can depend on availability of an HPU member to go to the *Abastos* market or elsewhere and funds to rent a stall. Pricing may be affected by the need for ready cash.

Other factors can and do play important roles. As a result of changes in transportation in the 20th century, potters chose to travel less to outlying markets. Pottery production has a seasonal element, and weather is an important factor during the rainy season, from procurement of clay through the firing process. At times, there is flooding on the routes to the clay mines or in them. Rain can slow the processing of the gritty clay; it can also slow the drying of the pottery, requiring it to be handled and moved more times than usual. Weather can also result in either precipitous firing with poor results or delayed firing causing producers to miss a market day. During the dry season, high winds can make firing dangerous and cause a wise HPU to delay a planned firing. Particularly important in the 1990s were the effects of government regulation and the larger economy on the lead-glazed pottery and its production and sale by Atzompa potters.

## Change

Probably the most important factors causing change during the 1990s were the events surrounding the lead glaze. In June 1991, the issue of enforcement of a federal regulation prohibiting the use of lead glazes in low-temperature firing was raised by the Mexican government and discussed in the national and local press. Articles appeared in Oaxacan newspapers about the danger of lead glaze, with photographs of Atzompa pottery.

THE LEAD GLAZE ISSUE AND THE RESPONSE OF THE POTTERS—In Atzompa, people read the articles and discussed the issue. Reactions included denial, joking, rumors, announcements over the loudspeaker system, and meetings at local and national levels. There was denial that there was lead in the glaze and denial that it caused health problems for the makers ("Our grandparents and great grandparents made and used the pottery") and denial that it caused health problems for the users. In the household where I lived, they said, "We have a *gringa* living in our house, and she has not died," and people joked that if they gave me pottery, I would die. There were rumors that the sale of glaze would be stopped, and people considered buying as much as they could and stockpiling it. The predicted date reported was 18 September. Some said it was "all political."

Since it was a national issue, a representative from the town, together with representatives of other pottery-producing towns, went to Mexico City to meet with government officials. Meetings were also held in the town, preceded by several announcements over the loudspeaker. At one, attended by about 15 people, a Oaxaca city potter spoke of the health problems caused by lead and said that the president of Mexico would not change his mind. As a potter, he sought to identify

with Atzompa potters. He discussed firing practices and said that he had funding from the state economic development office for experimental kilns and glazes. The representatives of Atzompa who had gone to Mexico City suggested that he come back the next day to talk to the whole community. However, although there was an announcement the next day over the loudspeaker, no meeting was held that week. Some people began to talk a little about health history in their families, convulsions, infant deaths, and numbness (neurological symptoms) (Hernández-Serato et al., 2003). There were also some reports of higher-than-normal incidence of retardation in the local schools. People who had laughed or shaken their heads at my efforts to measure firing temperatures became interested in my results and in the methods and equipment.

When I returned to Atzompa in June 1992, everything seemed to have returned to the pre-crisis status. When questioned, informants shook their heads and made comments such as "Nothing happened. It was all political." Production had not changed appreciably. However, in July 1993, an informant reported that a university graduate (*licenciado*) had come to the town and gotten permission from the mayor to go house to house to talk to people about the lead problem. People did not want to listen, however, and continued to assert that their grandparents had used the glaze. Someone else came and wanted to set up gas kilns in the center of town, costing $1000 MXN. Each firing would cost $2.6 MXN. People would have to bring their pottery, take it home to glaze, and bring it back again for the second firing. Furthermore, the kiln would not hold as much pottery as the wood-burning kilns. People did not want to do this and would not sign up for it.

That year, however, there was a noticeable increase in the proportion of unglazed ware being produced and concern expressed about decreasing sales of cookware. Production of *Artesanías* continued to grow. In 1995, it was reported to me by several potters that North Americans were not buying in the *Abastos* market. More HPUs were producing *Artesanías*, either unglazed or with decorative elements painted with red or white slip, different-colored glazes, and enamel or tempera paints. As mentioned above, an olla maker who had produced high-quality ollas for a trader in the regional markets in the early 1990s was selling ollas unfired to an artisan to ornament in 1994 and in 1995 making smaller ones, ornamenting them with appliqué and leaving them unglazed. This HPU was also making crosses formed in molds and had built a new, smaller kiln to better accommodate this pottery.

The events surrounding the development of the *Mercado de Artesanías* described in Chapter 5 coincided with these concerns. Opening first in 1991 and reopening in 1993, it provided an outlet initially for *Artesanías* but by 1994 sold all types of ware. It also changed the information flow and the dynamics between the potters. Interactions between members were not always congenial (Pérez, 1997, p. 111), but there was more contact between potters than there had been previously, and they saw each other's ware. Techniques and styles spread more rapidly than they had previously and seemed less confined to extended families.

Van der Leeuw (1993, pp. 241–243), in examining the choices made by the potters in Los Pueblos, looked at the relationship between technical and social change, noting that changes in technique can provide insight into social change because of the symbiosis between the two (see also Arnold, 2008, pp. 230–231). In Atzompa, it is clear that technological choices are enmeshed in social context. While the technology

TABLE 8.2. Change in pottery classes, 1992–1995.

| Class | 1992 | 1995 |
|---|---|---|
| Domestic | 18 | 17 |
| Greenware | 23 | 20 |
| *Artesanías* | 10 | 15 |
| Redware | 2 | 2 |
| HPUs making more than one class | 7 | 12 |

and methodology for making *Artesanías* had been available for some time, its use grew rapidly during the mid-1990s as a result of concerns about the lead glaze and the declining market for green-glazed pottery. Thus, economic forces were also a factor in change. Moreover, the creation the *Mercado de Artesanías* changed the social context of interaction between potters in the town inasmuch as people who had previously had little contact were talking to each other, viewing each other's pottery, and sometimes emulating it.

My data indicate that HPUs' choices of materials, end products, and market outlets changed more than once for most HPUs in my sample during the period of my study. This emphasizes the flexibility, adaptability, and resilience of Atzompa pottery production. There was an increase in the number of HPUs in my sample who were producing multiple types of ware and *Artesanías*. Ten HPUs were making *Artesanías* in 1991. By the end of 1995, this number had increased to 17, but most of the new *Artesanía* makers continued to make either Domestic ware or Greenware as well (Table 8.2). Five HPUs who had made only Domestic ware began to make either Greenware or *Artesanías* between 1992 and December 1995; two HPUs had ceased production by 1995 because of death or retirement. However, not all of the makers of Domestic ware had begun to try other *oficios* by December 1996; griddle makers continued to produce this unglazed ware, having kept their traditional markets. Thus, legislation and publicity about the dangers of lead toxicity had resulted in ongoing discussion and a gradual decrease in the use of the green glaze and an increase in the use of other surface treatments. Although most people in Atzompa at first had denied that the *greta* was lead ("*no es plomo, es greta*") or asserted that use of the glaze was not dangerous since it had, after all, been used for generations, potters were increasingly responding to market forces.

**Standardization**—The relationship between standardization and competition has been discussed by several scholars and is relevant to the changes that occurred in Atzompa. Foster (1965, p. 55) states that the absence of competition acts as a negative force to maintain traditional forms; that is, under those circumstances, there is no particular stimulus to push potters to come up with new or better products. Feinman (1982a, p. 182) believes that pottery produced in a context of reduced competition and increased concentration would probably show greater standardization and smaller energy input per vessel, as does van der Leeuw (1976, p. 402), who adds that along with reduced competition, less expenditure of energy would result from increased scale of production. Alternatively, increased competition frequently results in production of a wide variety of vessels, something that often requires a greater expenditure of energy to produce (Feinman 1982a, p. 182). Birmingham (1975, pp. 381–382), writing of potters in the Katmandu Valley, noted that as the dominant factor for the potters was the need to sell in a competitive situation, they made every type rather than specializing since

in that way they could sell more. Balfet (1965, p. 11), discussing village potters in the Maghreb, notes that to attract and hold a clientele in a competitive market, novelties are introduced.

Production and sale of both Domestic ware and Greenware, as Hendry (1992, p. 93) described for the 1950s and I observed from 1989 to 1992, conforms very much to the first scenario. The market was not highly competitive. HPUs were generally able to sell their full production, although with some seasonal fluctuation. There was little variation in sizes, and forms were consistent and standardized. This was true not only for the Domestic ware but also for much Greenware at that time since by the late 1980s these vessel forms had also become fairly standardized. Innovation and creativity were not encouraged, and although this was less true for makers of *Artesanías* during that period, some simply continued to replicate the forms and styles introduced by Teodora Blanco.

By the mid-1990s, however, the environment in which potters were working had changed. The more competitive situation encouraged and rewarded creativity and innovation, and it became worthwhile for a potter to devote more time, attention, and energy to each piece. Many HPUs had expanded their repertoires, and in the *Mercado de Artesanías* this was apparent in the increasing variation in types and styles on sale.

Stolmaker (1996, p. 121) remarked that the experience of making choices among alternatives might facilitate the acceptance of new ways. Hendry (1992) describes the Domestic and Greenware forms and the choices of clays deemed appropriate, and Stolmaker (Beals, 1975, pp. 309–310) lists the alternatives in materials available, clays, glaze and wood. In the 1990s, some of those options were no longer available (e.g., San Felipe clay), but there were others. Certainly, Atzompa potters have had a great deal of experience choosing between the many alternatives in their palette of choices, perhaps facilitating to a degree the willingness of many HPUs to incorporate the changes presented to them in the mid-1990s. However, the choices people make do not depend only on preferences and expected outcomes. They also depend on the information available, and this varied with the individual or HPU.

With the opening of the *Mercado de Artesanías*, information about new techniques spread through the town, in both formal and informal ways, more rapidly than in the past. The pottery of other HPUs was on display for all to see and emulate, and there was greater interaction between potters. Some who made Domestic ware initially sold it to artisans to decorate but subsequently experimented with ornamentation themselves, gradually improving their skills. The availability of the option of making *Artesanías* provided a choice for HPUs, making the continuation of pottery production economically feasible in a changing environment.

## CHAPTER 9: CONCLUSIONS

Santa María Atzompa is a town in which, in 1990, over 90% of the households were engaged in pottery production; the specialized potters produce primarily for an external market and are thus influenced by social and economic forces external to the household.

### Community Specialization

In examining craft production in an archaeological context, Costin (1991) developed parameters that she expanded in 2001. She defined specialization as economic interdependence between producers and consumers in a regularized permanent production system in which producers depend on extra-household exchange relationships and consumers depend on the producers for goods that they do not themselves produce (Costin, 1991, p. 4). Specialization requires the development of specific skills and intensity (i.e., time spent on a craft) and compensation (Costin, 2001, pp. 279–282). Such was the case for Atzompa potters in the 20th century and probably for much longer. Pottery production in the town conforms to the specialized household-scale production model discussed by Feinman (1999, p. 85), in which specialized household-scale production yields high volumes of craft goods at least partly for exchange. It is also what Costin (1991, p. 8) calls "community specialization," in which autonomous individual or household-based units are aggregated within a single community, producing for regional consumption. These potters are independent producers existing in a context of high demand with unequal resource distribution, a situation that has existed in Oaxaca since pre-Hispanic times.

Costin (1991, pp. 11–15) indicates four parameters for inclusion in this category, many of which have been discussed for Atzompa in the preceding chapters. First is *context*, in which independent specialists in preindustrial societies are more likely to produce utilitarian goods for a general market, such as the Domestic ware that Atzompa potters have long produced and marketed in the region. Because of the thermal-resistant quality of the Atzompa clays, there continued to be demand for this ware at least into the 1990s.

Costin's *concentration* is spatial organization and location of producers, whether evenly distributed in a population or in specialized communities. The latter is often found in areas with environmental diversity, such as Oaxaca, and transportation plays an important role in distribution, enabling the transfer of goods from producers to consumers. These specialized communities are more apt to be concentrated in regions with strong market systems such as Beals (1975) has described for Oaxaca.

For Costin, *scale*, or constitution of the production units or work groups, includes size, the number of potters per unit, and how labor is recruited. She states that both large and small facilities can be profit oriented, and she stresses the importance of the efficiency of the production unit, a function of the technology used that includes how specialization within the workshop affects the lowering of per unit costs. In Atzompa, although the HPUs are relatively small and labor is based on kinship, all practice some specialization through division of labor; no one potter does every task involved in pottery production. Furthermore, even forming tasks are often divided between individuals, one doing basic forming and another adding appliqué, handles and so on, or, in the case of figures, one person might form the body on a revolving platter and another add a mold-made head, hand model the arms, and add appliqué decoration.

Costin's *intensity* parameter refers to the amount of time producers spend, with three factors involved: efficiency, risk, and scheduling. Efficiency refers to the capacity to routinize production, setting up something on the order of an assembly line or mass production whereby an individual works at one

task or one task at a time. In Atzompa, along with the division of tasks described under scale, a potter working on a revolving platter would make several or many bodies of ollas, jugs, or coffee mugs, then set them aside and later add necks to all, similarly adding handles or appliqué decoration. Glazing is conducted the same way, applying glaze to the inside of all vessels first, then the outside. Some HPUs did more of this than others; see Chapter 6, where described is an extended family producing a large volume of Greenware, with each individual handling one forming task on many items before passing them on to another person. These methods yielded increased output and lowered per unit costs. Arnold (2008, pp. 90, 323) notes that in the Maya town of Ticul, produetion unit size does not need to increase because of the availability of household labor and that the size of the production unit is not necessarily related to its composition (i.e., how members are recruited). Finally, Costin characterizes independent producers as risk minimizers. Some Atzompa HPUs combined potting with farming and wage labor, something that they had done for many years as both Hendry (1992) and Stolmaker (1996) have described. We have also seen how they managed risk in the uncertain transitional period of the 1990s when, while trying new types of ware and exploring new markets, they continued to produce their previous types for their former markets. This correlates with Papousek's (1984, p. 504) observation that during a transition period people are forced to look at new methods but adjust existing production rather than replacing it.

### Continuity and Change

Arnold (2008), in his longitudinal study of pottery production in the Maya town of Ticul, has looked at economic and social change between 1965 and 1997 as they relate to pottery production in this community of specialized potters. These include shifts in demand for some vessel forms and changes in markets and distribution and change in the numbers of potters and size of production units. Corresponding roughly in time to the three studies in Atzompa (Hendry in 1955, Stolmaker in 1969–1970, and Thieme in 1989–1995), one can see some similarities in the changes that occurred and the ways in which the potters successfully adapted to change. Both industries have continued to be household based, although Ticul began to use some wage labor in some of the larger units (Arnold, 2008, p. 90). Both eommunities suffered the decline in demand for some pottery types, Ticul water vessels, and Atzompa green glazed pottery, and both developed new types for new markets. Ticul potters learned new forms and decorative techniques (Arnold, 2008, pp. 113–118), plant pots, and wall decorations as well as figures and forms to appeal to tourists, analogous to Atzompa *Artesanías*. Both communities of potters practiced diverse forms of fabrication and decorative techniques, deriving their raw materials from multiple sources, some of which changed (Arnold, 2008, pp. 158–171, 192–193). Changes in procurement occurred in both communities as potters began to outsource some tasks: to buy clay and temper from men who dug it for sale rather than dig it themselves and to buy fuel (Arnold, 2008, pp. 282–284, 312), in Atzompa to buy glaze, and in Ticul to use brokers to fire and sell their pottery. Firing remained a task of Atzompa potters, and using brokers or traders to sell the pottery was not new for Atzompa potters. However, in both communities, changes in distribution of pottery occurred. Changes in transportation resulted in less travel by potters in both communities for different reasons. The lack of railroad transport to the market for their new types of potters meant that Ticul potters no longer sold their pottery themselves but used brokers (Arnold, 2008, pp. 150, 312). For Atzompa potters, more available transportation meant that traders could move pottery less expensively, and it was not cost effective for the potters to travel themselves to villages and local regional markets as they had in the past. Importantly, both industries remained household based.

**Summary of Changes in Atzompa**—Population in Atzompa doubled between the 1950s and the1990s, and people moved into previously uninhabited land on the east and south of the town. A most telling change was the installation of electric light in the late 1960s, making it possible for potters to work at night, extending the workday. Improved bus service to and from Oaxaca City meant that family members could go to and from the city for work and school and to shop, including purchasing glaze. It also meant that more buyers came directly to the town with trucks, and fewer potters went to the smaller local and regional markets. Plastic, a by-product of the Mexican petroleum industry, was used for pails to hold glaze, for sieves, and for sheets to cover clay and pottery in various stages of production. There were changes in pottery materials; one source had become nearly unavailable, and green glaze could be purchase already prepared.

However, the household model of production was maintained. While there were shifts in the division of labor, gendered division of labor continued, although with changes in the allotment of some specific tasks. This was the case in the kick-wheel HPUs, where men were the pot formers and women took on clay preparation and finishing tasks, thus retaining or increasing the efficiency of scale and intensity. In addition, able to buy both clay and glaze, women could operate more independently if a man was not present or was unwilling to participate in pottery production.

Clearly, however, the most important changes were externally generated. In the years following Hendry's study, the output of pottery, particularly Greenware, grew. This was facilitated in part by the increase in inputs of materials resulting from the shift to purchasing clay and prepared glaze and resulted in increased yield for most HPUs during this period. Congruently, between the 1950s and early 1990s, the growth in the tourist market for Greenware stimulated the inereased production of this ware, and the production changes described enabled Atzompa potters to fulfill that demand. As male labor became available to make Greenware by hand modeling or on kick wheels, it became possible to produce a larger volume of this pottery with less labor and thus respond to the demands of that growing market. By the late 1980s and early 1990s, the production of both Domestic and Greenware had greatly increased, probably reaching an all-time high.

In the early 1990s, the lead glaze issue motivated the next transition, again externally motivated. Loney (2000, p. 648) points out that inventions and innovations are "constructions of revamped past technologies" put to new applications. In the development of *Artesanías*, many potters took the vessel forms they had been making for centuries—ollas, jugs, basins, griddles, and so on—and ornamented them with relief, appliqué, slip, colored glazes, and so on in floral and other designs. Although they sometimes changed the sizes, they retained the basic forms and motor skills to which they were accustomed, and they continued to use the same clays and to

fire in the same ways and, for most, in the same kilns. They had rejected the use of gas- or kerosene-fired kilns as not only dangerous but also not suited to the household production system to which they were accustomed.

This shift to the production of *Artesanías* resulted for some in a reduction in the volume of pottery being produced. This did not necessarily mean a decrease in total return, however, since sale prices for individual pieces rose. By the mid-1990s, as the demand for *Artesanías* grew, increasing numbers of HPUs became aware that, with less or equal expenditure for clay, glaze, and fuel, they could produce pottery that could bring a greater profit per piece than either Domestic or Greenware, although more time might be spent per piece in production. These factors encouraged innovation and creativity and a flowering of experimentation in new surface modification and design elements. Since both HPUs and individual potters were trying new *oficios*, there was greater diversity in both production and marketing strategies, and as more HPUs began to experiment with the production of *Artesanías*, potters became increasingly excited and proud of their new skills, products, and endeavors.

The social relations and organization of production did not change drastically, but that of distribution (i.e., marketing) was transformed. Although HPUs continued to use their accustomed outlets to sell Domestic and Greenware, as the 1990s progressed, outlets for *Artesanías* grew and changed; they included new stores in Oaxaca City and Atzompa and the *Mercado de Artesanías*, where sales were to individual tourists and to dealers from Mexico and abroad. The *Mercado de Artesanías* effected changes in social relationships and increased interaction among potter families, and this in turn led to increased sharing of information, knowledge, and techniques. It affected both the ways in which pottery was marketed and the interaction and interchange of ideas between HPUs. How this will affect transmission of skills and relationships between Household Production Units and between individuals in the future is not clear.

Van der Leeuw (1993, pp. 242–243) points out that both unchanging and changing aspects and the interplay between the two are essential, and while some elements of a technique are essential, others are changeable, and the potter makes decisions in making choices. The Atzompa potters in the 1990s chose to continue making pottery in the social context of the Household Production Unit, choosing rather to change the style of ornamentation and distribution to appeal to a new market when external forces (the lead glaze issue) was forcing them to find one.

The number of choices and options and the capacity of HPUs to make changes in their methods and ware and to adapt to changing economic conditions and markets can be considered a reflection of a long and varied history of ceramic production using the clay sources still being exploited. The pre-Hispanic use of these sources is indicated by the presence of ceramic production sites nearby (see Appendix I). Feldspar tempered buff (*crema*) wares were produced at several of those sites in the Formative Period. During the Classic Period, when graywares were made in standardized forms throughout the Valley of Oaxaca, potters in the Atzompa area were also making pottery for the demands of Classic Period consumers. Feldspar-tempered grayware (*gris cremosa*) may have been made at a site near San Lorenzo Cacaotepec (site CV0S 14–15; 2–9–25) and at the Atzompa site located on the hill above the modern town. It seems likely that those potters were using the same clay sources or ones from geologically comparable structures and that knowledge of the mines was passed down to them from earlier potters who had made *crema* wares at the sites near those sources (Joyce et al., 2006). Atzompa is mentioned in ethnohistorical sources as a dependency of the Mixtec town of Cuilapan at the time of the Spanish conquest. It may be that ceramic production occurred in the town during the Postclassic Period since according to oral tradition in the town, the forebears of present potters made red-on-cream before they began to make green glazed ware in the Colonial Period. Both oral tradition and INAA analysis (Neff & Glascock, 1995, 2007) indicate production using Atzompa clays during the Colonial Period. As we have seen, during the 20th century, the structure of the production and pottery styles changed more than once as previous options ceased to be available and new ones opened up.

Although we cannot presume that there was biological continuity of the population of potters, it can be suggested that knowledge and use of clay sources, production methods, and vessel forms may have been transmitted from earlier periods. The location of Atzompa in the Valley of Oaxaca, near the urban center of Monte Albán in pre-Hispanic times and Oaxaca City in colonial and modern times, provided a sizable market for pottery, and this is an important factor in the growth, continuity, and survival of the industry. The number of clay sources used by Atzompa potters and the variety of forms, methods of production, and surface treatments create a palette of possibilities for Household Production Units. They can make choices of clays, forms, methods, decoration, and marketing strategies, and they can combine and shift them as circumstances change, both in individual circumstances and in the greater economy and society. The advent of green glaze in the Colonial Period may have been such an alternative for the potters, making it possible for them to produce ware that they could sell to colonial buyers.

In looking at the ceramic production of this town, one cannot help but note the number and variety of materials, forms, and styles that form this complex. Communities with the greatest diversity of materials, forming techniques, and types of pottery appear to be the most viable and long lasting (Arnold, 2008, p. 313). The number and diversity of choices and the flexibility that HPUs have to adjust these choices as family, life cycle, individual, and external circumstances change could be considered elements of risk management in a rapidly changing environment. They may have been factors in the perseverance of this industry in Atzompa. The shifts in pottery production strategies in the 1990s could be viewed as simply the most recent adaptation to changing social, economic, and technological conditions in a long continuum of pottery production in the vicinity. This long and varied experience of ceramic production has resulted in knowledge and flexibility to adapt to changes in market demands and a capacity for innovation.

The complexity of Atzompa pottery production can be considered to be a reflection of this long tradition. In the last decade of the 20th century, it was in a state of transition, a situation that has probably occurred at other times in the long history of ceramic production in the town and surrounding area. As Mario Rabey (1989, pp. 176–177) points out, the technology of simple societies, whether isolated or part of a larger society, is probably always changing as it adapts to changing conditions in the environment that surrounds it, and the members' technological creativity allows them to integrate

within the larger society without losing their identity and tradition. He calls this "negotiated integration." Such appears to have long been the case with these potters. The potters of Santa María Atzompa have demonstrated the capacity to take advantage of changes in availability of materials and market demands, modifying their production methods and products as changes have occurred. With the rapid change taking place in the *Artesanías* market, it is difficult to predict the future.

**Predictions**—Hendry (1992, p. 128), writing in the late 1950s, commented that while future developments could not be accurately foreseen, she thought that when the state industrialized and people's buying power increased, handmade pottery utensils would be replaced by factory made ones, probably metal, and while this would put many potters out of business, some might turn to making what she called "specialties," that is, mainly Greenware. Furthermore, if that market continued to expand, more men were likely to take up vessel forming, and this would result in the adoption of more modern techniques, such as the kick wheel and press molds, at that time used by only a few. She also predicted that changes would occur only as they happened in the wider context of the valley and southern Mexico as a whole and that pottery making would undergo few fundamental changes in the immediate future and would remain "one of the central complexes of the village culture for some years to come."

Certainly, she was correct in the last statement. In Atzompa, ceramic production has both remained central to the village culture and was affected by changes in the wider economy and society. However, the demand for Domestic ware did not decline because of replacement by factory ware. Atzompa cookware continued to be popular throughout Oaxaca into the early 1990s and has not disappeared. Its reputation for quality continued to create a demand. The volume sold at the *Abastos* and regional markets was large then and showed no sign of declining in the early 1990s, and many HPUs were involved its production. However, as we have seen, by the mid-1990s this had changed not because of competition from factory-made ware but because of concerns about lead glaze. Hendry's predictions of increased male participation in the forming stage indeed occurred. For the most part, these men were forming Greenware in the early 1990s, although later many turned to *Artesanías*. The number of people using kick wheels increased and continued to grow and in the later years included more women. Corresponding to this was an increase in the participation of women of these HPUs in clay preparation and finishing tasks.

Stolmaker (1996, p. 130), writing in the early 1970s, also made some forecasts. Since profitability largely depended on the decorative ware, for which demand was increasing, she felt that growth and innovation in this area would be advantageous. Because of the demand for Greenware, a major innovation should be a local electric glaze mill, preferably several, so that the profits could stay in the village. In addition, she hoped that a firing method could be developed that would reduce or eliminate the dependence on increasingly scarce and expensive wood.

As she predicted, there was increased production, innovation, and creativity in the production of decorative ware. We have seen the development of the glaze cooperative, although it did not have an electrified mill and was not totally successful. Its membership declined, and village support was variable, but it continued to exist and supply glaze to users. As to firing methods, wood continued to be used. The options of gas or kerosene were both dangerous and unsatisfactory for the individual household and large-volume production, and these were options the potters declined to choose. As long as sawmill trimmings continue to be available, there is little likelihood of change in firing methods. The use of wood-burning kilns suits the household production structure and has a long tradition.

It seems likely, however that innovation will continue in the immediate future. The efforts to produce a usable, economical, lead-free glaze may prove successful, making it possible for a stable market and continued production of Domestic ware at least, but this is unclear. Clay sources may pose a problem in the future. The volume of production in the last half of the 20th century, particularly of Greenware, may have depleted the San Lorenzo Cacaotepec source. However, the shift to *Artesanías* may slow down the depletion since it increases the profit per piece and reduces the amount of clay used overall.

The Household Production Units of Atzompa are controlling the direction of change, accepting those suggestions and innovations that suit them, such as the use of tempera paint and enamel in *Artesanías*, but rejecting others that do not fit with their goals and structures, such as gas or electric kilns. The making of pottery has a long history in this town, and although there have been changes recently as well as in the past, pottery continues to be central to the town's identity. For some in Atzompa, the making of green glazed pottery is who they are, but it may not have always been so and may not continue to be, certainly not for everyone. Although the possibility of finding a solution to the lead glaze problem for cookware should not be ruled out, the town seemed to be finding a new niche in the *Artesanías* market. Potters have recognized a market that they can exploit. This market includes not only tourists and stores in Oaxaca but national and international dealers who sell to interior decorators and museums elsewhere. For a long time, making pottery has been central to the lives of the people who live in Atzompa, and although many now commute to Oaxaca City for jobs and education and may not always consider making pottery to be what they do, most continued to participate in ceramic production when present in the town.

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## Appendix I: Archaeological Sites with Evidence of Ceramic Production

From sites surveyed in the Valley of Oaxaca Settlement Pattern Project, there is archaeological evidence of ceramic production in the vicinity of Atzompa and San Lorenzo Cacaotepec near the clay sources used by present-day Atzompa potters (Fig. I.1)

Site 2-4-2, CVOS-16, known also as Las Minas, is a Middle Formative/Rosario or Early I site located N65°W, 2700 m from Santa María Atzompa; it was surveyed by Kowalewski. Dating for this site is uncertain. "The southern part overlaps one of the principal sources for the coarse gray clay used by modern Atzompa potters." This was probably the gritty clay used in the 1970s, noted by Charlotte Stolmaker (1967) as *La Casaguatera.* A six-to-one proportion of *crema* sherds was noted, and the temper or grog appeared to be the same material as the rock found in the gritty clay mined at the site. Although no kiln wasters were found, six unformed chunks of fired clay and two smooth pebble polishing stones might indicate pottery making (Kowalewski, 1976, pp. 30–31).

Site 2-5-3 (2-4-1), CVOS-6, also called *La Nopalera*, is a Formative site surveyed by Kowalewski (1976, pp. 29–30, 45–46); it is located N32°W, 1650 m from Santa María Atzompa in grid square 1405404, "just west of a source of fine clay used by the Atzompa potters," that is, the *laguna* source. There were light densities of Guadelupe and Rosario phase sherds and a possible kiln waster, evidence that it may have been a ceramic production site in late Rosario/early Monte Albán I. Feinman (1980, pp. 63–66, 1982a, p. 188) noted that "the number of both unpainted *crema* bowls (6) and non-diagnostic *crema* sherds (20) ... was relatively high and it appears that this settlement may have been a *crema* ware ceramic production site in Early I."

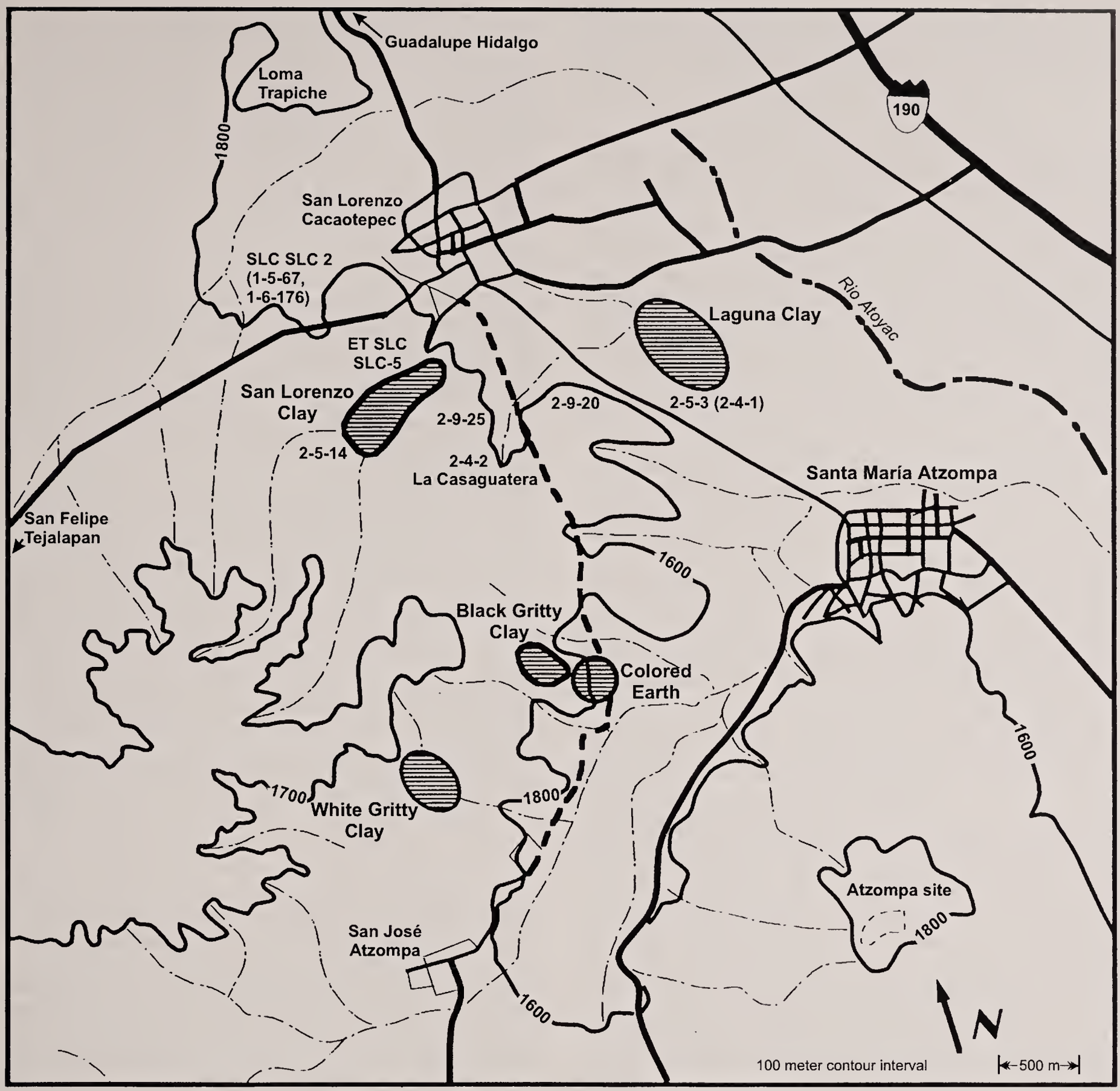


FIG. I.1. Clay sources and archaeological sites.

Site 2-5-14, CVOS-80, another probable Early I production site, is located S88°E 3700 m from San Felipe Tejalapan in grid square 1404. *Crema* ceramics in a great variety of forms are overwhelmingly more abundant than graywares. The sherds are unusually large, suggesting that *crema* pottery may have been produced at this site (Kowalewski, 1976, pp. 55–56). The presence of a dense concentration of a single ware makes this more probable (Feinman, 1980, p. 66, 1982, p. 390).

Site 1-5-67/1-6-176, a Late Formative (MA I) site located on the west side of San Lorenzo, shows clear indication of large scale ceramic productions. Feinman (1986, p. 356) noted that it was located near a riverbank clay bed mined by contemporary potters and was littered with Formative *crema* sherds with white inclusions, generally decorated with red paint. There were also numerous fired clay concretions and rounded clay slabs.

Site ET-SLC-SLC5 located near the modern town of San Lorenzo Cacaotepec and a modern source of riverbed clay was described as an additional site where Early Monte Albán I ceramics were produced. Feinman (1980, pp. 76–77) describes the density of surface pottery as light to moderate in two areas. He observed clay concretions scattered in collection area 14503 where the surface pottery was most dense. These were shaped like rounded clay bricks, made with *crema* paste with white inclusions. While almost all period types were present, the Monte Albán Period I *crema* types were far more abundant than *gris* or *café* types. Feinman (1982b, p. 391) also suggests that it is probable that production of *crema* utility wares may have continued at this site into Late Monte Albán I and perhaps into Monte Albán II, although he thinks the latter unlikely.

Site 2-5-14, located on a hillside with white bedrock soil, was also reported as a probable Early Monte Albán I production site with "unusually large sherds and *crema* ceramics in a great variety of forms" (Kowalewski, 1976, pp. 55–56).

Site 2-9-20.25, CVOS 14–15, located in grid square 1405 S 3 W, 800 m from San Lorenzo Cacaotepec, was reported to have been a ceramic production site during the Late Classic Period, MA IIIB-IV with both *gris* and *gris cremosa* sherds abundant in an unusual variety of forms. It is located "only 250 m southeast of a clay source for the contemporary potters of Atzompa" (Kowalewski, 1976, pp. 317–318). The surface ceramic density at the site varied from light through moderate, with the heaviest densities noted at the center of the occupation of this small village. Included were possible kiln wasters and a mold fragment for a Classic Period funerary urn (Kowalewski, 1976, pp. 318, 1989, p. 256; Feinman, 1980, pp. 108, 111, 1982b: p. 393).

In addition to the sites from the survey, the INAH conducted a salvage excavation at Loma del Trapiche and Loma del Taladro near San Lorenzo Cacaotepec and identified ceramic production, including two kilns that are described in Appendix IV.

The Atzompa site, located on a hill above the modern town, approximately 4 km north of Monte Albán, is considered to have been a suburb of Monte Albán. It had a long occupational history, but the majority of terraces were occupied primarily during the Late Classic Period, Monte Albán IIIB. In addition to evidence of elite occupation, there was evidence of a distinctive marketing-distribution system distinct from other parts of the city. There is some indication of ceramic production from a "relatively high proportion of kiln wasters" (Blanton, 1978, pp. 88–91).

Feinman (1982a, p. 196) suggests that Classic Period Atzompa ceramic production may have been massive in scale. The characteristic *crema* ollas classified as G1 and T1120, and bowls G-35 and T1126 (Caso et al., 1967, pp. 385–395, 425; Blanton, 1978, pp. 177–178) occurred in large quantities at Monte Albán, throughout much of the Central survey area and in the southern half of the Etla arm of the valley. In addition, Blanton (1978, pp. 89, 178) noted that unlike other barrios of Monte Albán, *comales* with *gris cremosa* paste (1125) are "abundant at Atzompa, but rare to absent on other parts of the (Monte Albán) site." Feinman (1982b, p. 394) also noted that the Classic Period grayware from the Etla arm of the valley south of the modern town was similar to the *gris cremosa* pottery from the Atzompa site and could contained feldspathic material obtained from a mine used by modern Atzompa potters. Thus, the possibility that it was produced at Atzompa was worth further investigation (see Joyce et al., 2006).

## Appendix II: Typology of Monte Albán Pastes and Vessel Forms

### Color Classes

In their study of Monte Albán ceramics, Caso et al. (1967, pp. 18, 479) divided Monte Albán ceramics into four color classes: G *gris* (gray), C *crema* (buff), K *café* (brown), and A *amarillo* (yellow). Two other categories for discrimination were made: first, composition of nonplastic inclusions (temper), namely, quartz sand and white feldspathic, and, second, size of the temper particles: coarse and fine (Table II.1). The Caso et al. classification was further elaborated by Kowalewski et al. (1978, pp. 167–193) during the Valley of Oaxaca Settlement Pattern Project. They subdivided the *gris* and *café* types into two groups, fine or sand tempered and coarse feldspathic tempered, labeling the latter *gris cremosa*; they also added to the typology Early Formative *crema* types and Postclassic ones (Kowalewski et al., 1989, pp. 829–837).

TABLE II.1. Paste typology.

| Color class | Temper | Size of temper |
|---|---|---|
| *Gris* (gray) | quartz sand | |
| *Gris cremosa* | feldspathic | coarse |
| *Gris* | feldspathic | fine |
| *Crema* (buff) | feldspathic | coarse |
| *Crema* (buff) | feldspathic | fine |
| *Café* (brown) | quartz sand | |
| *Café* | feldspathic | coarse |
| *Amarillo* (yellow) | quartz sand | |

*Crema* ware was made from a buff-firing clay and *café* and *amarillo* from dark and light red-firing ones. The colors of these categories result from mineralogical components in the clays when oxidation firing is complete. Graywares are produced by smudging or reduction firing. In this technique, the potter seals the kiln with damp earth; this produces smoke, saturating the pottery with carbon. It also creates a reduction atmosphere by limiting the amount of oxygen in the kiln; the gray surface is the result. This technique was widely practiced throughout Oaxaca, particularly during the Classic Period (300–800 CE); it is utilized today in San Bartolo Coyotepec (Appendix VI). Although not immediately visible, the clay colors of graywares can be discriminated by refiring the sherds in an oxidizing atmosphere at a temperature of 800°C resulting in *crema*, *café*, and *amarillo* colors (Shepard, 1967, p. 479).

Shepard was struck by the relationship between Caso's paste color classes and her temper studies and noted the correlations between the color classes and those shown by her tabulations, namely, that when the distinctive color pastes are segregated, all the *cremas* have white feldspathic inclusions and most of the *amarillos* have sand temper. Graywares are mainly sand tempered like the *amarillo*, but there is a small distinctive group with white inclusions. Finally, the *café* sherds are mixed (Caso et al., 1967, p. 19). *Café* pottery was less uniform than the other three classes; a fifth of a sample of 314 had feldspathic inclusions, and one, form K19, a perforated jar (*pichancha*), exceeded the number with sand temper. This, she noted, was the only exception to the association of the buff paste with the rock temper (Shepard, 1967, p. 479).

While there were some sherds of colors intermediate between *café* and *amarillo*, Shepard comments that refiring of *crema*, *café*, and *amarillo* sherds at 800°C in an electric furnace makes the colors clearer (Shepard, 1967, p. 479; Caso et al., 1967, p. 18), and she notes that if it is established that some of the *café* sherds were simply less than well-fired *cremas*, these will be merged with the *cremas* to which they belong. To summarize, the classifications, including Shepard's comments (Caso et al., 1967, pp. 18–19; Shepard, 1967), the pastes are divided in three ways: color, temper, and size of temper (Table II.1).

Graywares were produced in all periods. They were, however, the predominant ware of the Classic Period and Monte Albán IIIA and IIIB-IV (Table II.1) and appear to have been standardized and produced in quantity during that

period (Feinman, 1982a, p. 196; Kowalewski et al., 1989, p. 213). Monte Albán *gris* sherds are mainly sand tempered. Shepard (1967, p. 479) observed, however, that the rock temper occurred in six of the less numerous types (G7, 9, 25, 30, 35) in one of which, G30, the division between feldspathic and sand tempers was nearly equal. The texture of the white inclusions in these types is fine, and the "*paste oxidizes to buff on refiring*" (italics added). In addition, she comments referring to types G7 and G30 in a small sample of Monte Albán Period I graywares in which the two temper types were roughly equal, that potters using *crema* pastes might sometimes have followed the forms and styles characteristic of graywares and occasionally practiced reduction firing (Caso et al., 1967, p. 43). She further comments in a footnote regarding the temper groups of grayware sherds that when she first identified the material, she had no idea of its source but it seemed probable that it could be secured near Monte Albán and that the two principal paste (i.e., temper) classes represent different local pottery making centers (Caso et al., 1967, 19).

In addition to those *cremas* and graywares with white inclusions, there are several *café* types with some proportion of feldspathic tempered sherds, that is, K8, Monte Albán Period I; K19 from Monte Albán Periods I and II; and K11 from Monte Albán Periods II and IIIa (Caso et al., 1967, p. 20). Further investigation with current analytical techniques may make it possible to determine the clay sources for these. In the recent past, modern Atzompa potters utilized the San Felipe Tejalapan source, which fired to a similar color.

Regarding texture, Shepard (Caso et al., 1967, p. 43) noted a "close correlation between texture and wall thickness; crude thick walled vessels generally have a coarse temper; thin walled well finished ones a fine texture." This observation conforms to what we see in Atzompa ware today, as noted in Chapter 4.

### Vessel Forms

The classification systems developed by both Caso et al., (1967) and Kowalewski et al. (1978; Blanton, 1982, pp. 375–381) group ceramics both by paste and by form and decoration. It is notable that many of the traditional forms of Domestic ware vessels being made in Santa María Atzompa in the 1990s are similar to those illustrated for each period by Caso et al. (1967). These include *ollas*, *apaxtles*, *comales*, *pichanchas*, *cahetes*, *floreros*, and *braseros*.

Ollas, similar in shape similar to the modern Atzompa types, were produced in buff (*crema*) paste from every period and during the Classic Period in graywares with the white feldspathic inclusions (*gris cremosa*) (Caso et al., 1967, lamina VIIa,b, p. 219, fig. 185a, p. 220, fig.186c, p. 337, fig. 280c, p. 425, fig. 358c).

Basins (*apaxtles*) were described in buff (*crema*) pastes in Monte Albán Periods I and II (Caso et al., 1967, lamina VIII). As mentioned, griddles (*comales*) with white feldspathic inclusions were abundant at the Atzompa Classic Period site (Blanton, 1978, p. 88). A perforated jar (*pichancha*) made from rock-tempered *café* paste, type K19, is illustrated by Caso et al. (1967, p. 253, fig. 232). Flower vases very similar in style to those produced by modern Atzompa potters were made beginning in Monte Albán Period II in *crema* paste and in the Classic Period in *gris cremosa* (Caso et al., 1967, pp. 170, 302, fig. 257a, p. 339, fig. 382). Thus, there are strong indications that along with continuity in the use of clay and tempering material, as shown in instrumental neutron activation analysis sourcing studies (Joyce et al., 2006), there is also continuity of form and style of vessels.

## Appendix III: Instrumental Neutron Activation Analysis

Instrumental neutron activation analysis (INAA) has been described by Neff (Thieme et al., 2004) as taking advantage of the property of atomic nuclei to become radioactive when exposed to neutrons. If the nucleus of an element captures a neutron during this exposure, it is elevated to a high energy state and becomes unstable. In order to return to an energetically stable state, the atom emits some form of particle or electromagnetic radiation. INAA focuses on the emitted gamma rays, whose energies are characteristic of the radioisotope. Measurement of gamma-ray emissions at different energies yields an accurate and precise "elemental fingerprint" of the sample.

INAA has been used to study the compositions of many archaeological materials, including lithics, glass, ceramics, metals, and even osteological remains. Although several analytical techniques are available for the elemental characterization of ceramics, INAA is particularly useful because of its reproducibility, even under varying analytical conditions, over long periods of time, and in different labs. Because it is so robust in the face of variation in instrumentation and analytical protocols, it is the technique of choice for generating and maintaining large databases against which future results can be compared (Glascock, 1992; Neff, 2000; Thieme et al., 2004; Joyce et al., 2006).

INAA of ceramics is well developed because of the efforts of many researchers, both archaeologists and physical scientists, and has produced a wealth of data for determining provenience of pottery from almost every region of the world. The INAA protocol used to analyze the Oaxaca ceramics is relatively straightforward and is described in detail by Glascock (1992). In brief, two irradiations, three gamma-ray counts, and a standard-comparator approach to calibration are used to obtain concentrations data for 33 elements.

Figure 3.5 in Chapter 3 shows the major structure in the data illustrated on the first two principal components (for a discussion of principal component analysis, see Glascock, 1992; Neff, 1993a, 1994). The Atzompa ceramic materials fall on a continuum with the gritty clays (temper) at the low end of component 1 and *laguna* clays at the high end; *laguna* pottery, which incorporates the gritty clays added by the potters, falls at an intermediate position. San Felipe clays and sherds fall within the range of chemical variation of the *laguna* pottery. Also near the center of the plot but partially distinct from the *laguna* ware is the San Lorenzo pottery, prepared pastes, and clays. These form a single, relatively homogeneous compositional group; the San Lorenzo clays and sherds to which potters added gritty clay could not be discriminated reliably from those to which they had not.

In Figure III.1, the chemical basis of group separation is illustrated by plotting coordinates for the elements on the first two components, in effect providing a two-dimensional representation of the variance–covariance structure of the data (Neff, 1994). As shown, deviations toward the low end of

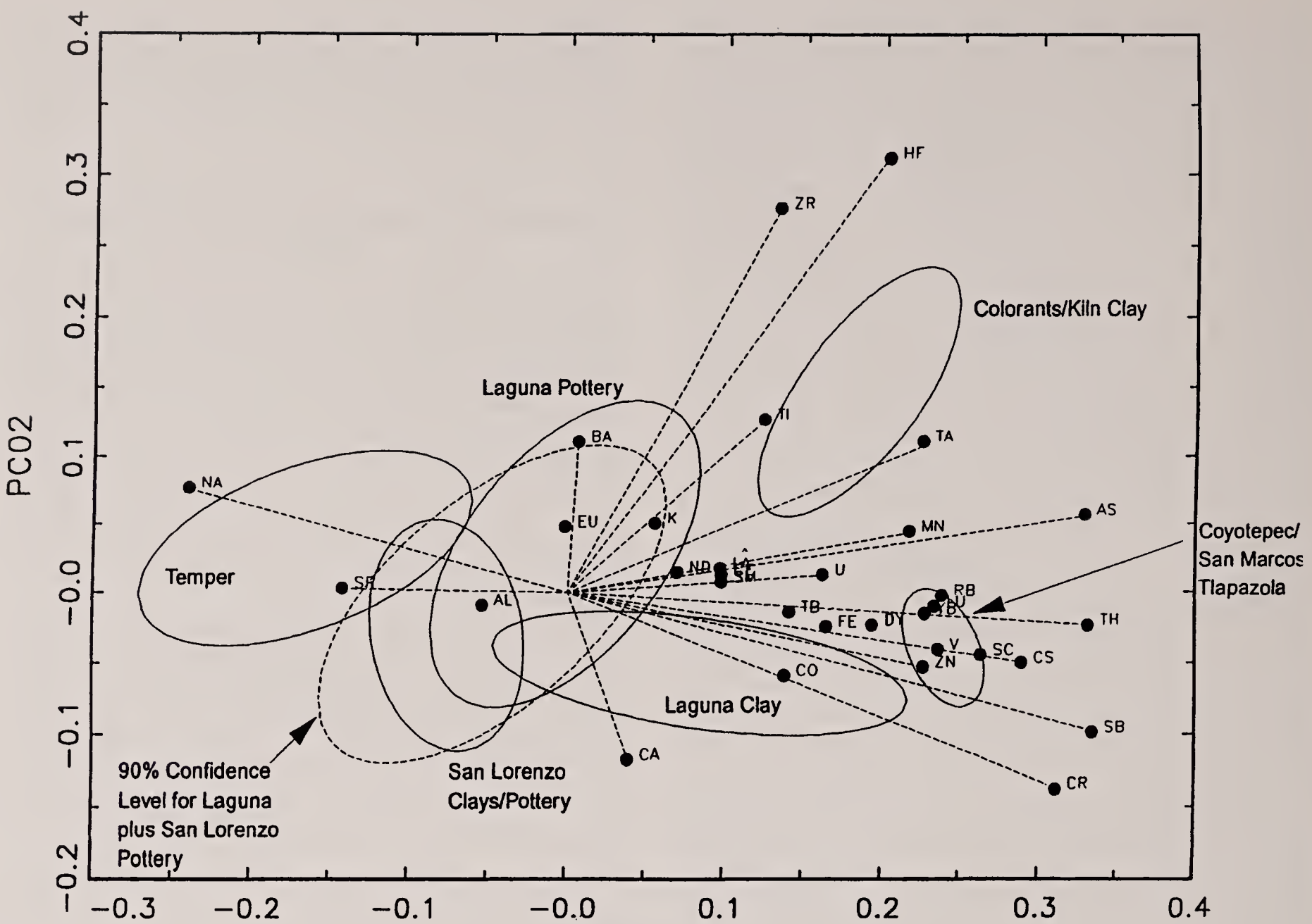


Fig. III.1. Plot showing chemical basis of group separation.

component 1 are created largely by high sodium, which in the case of the tempering materials must come from the feldspar-containing rock fragments, and by dilution of a number of elements, most obviously arsenic, thorium, antimony, and chromium. *Laguna* clays, in contrast, are enriched in the those elements and diluted in sodium. *Laguna* pottery, being a mixture of *laguna* clay and tempering material, occupies an intermediate position on this enrichment–dilution axis. San Lorenzo clays, which are closer to the tempers on the enrichment–dilution axis, are not as noticeably affected by addition of temper, and the clays and pottery thus form a single group. The colorants and kiln clays are distinguished by anomalously high hafnium and zirconium, probably reflecting high proportions of zircon grains in these relatively silty materials (Neff, 1992).

Figure III.2 is a bivariate plot of antimony and arsenic concentrations in pottery from the four pottery towns in the Valley of Oaxaca sampled in this study. The ellipses represent 90% probability of group membership. In this plot, both sherds and clays are plotted. Raw temper and raw clay analyses from San Marcos Tlapazola are also shown to illustrate that San Marcos Tlapazola pottery expresses contributions from both clay and temper. Materials from the other valley pottery towns were clearly distinct and separated from the various subgroups of Atzompa pottery and pottery clays.

The analysis data and provenience data for the samples from this study are included in the University of Missouri Research Reactor database (www.missouri.edu/~reahn). Samples of clays and sherds, for the most part corresponding to those analyzed by the University of Missouri Research Reactor (MURR), were provided to Gary Feinman for further analysis in 1992. He has placed them in the Field Museum Collection.

## Appendix IV: Pre-Hispanic Kilns

Two kilns were excavated in a residential zone at Monte Albán in 1972–1973, dated to Monte Albán IIIB-IV and described by Winter and Payne (1976). They are similar to those currently used in Atzompa and described in Chapter 4. The larger of the two, feature 5, was cylindrical with a diameter of 1.4 m at the bottom. It was excavated into bedrock. The upper part, which was partially destroyed, consisted of a wall formed of stones mixed with clay.

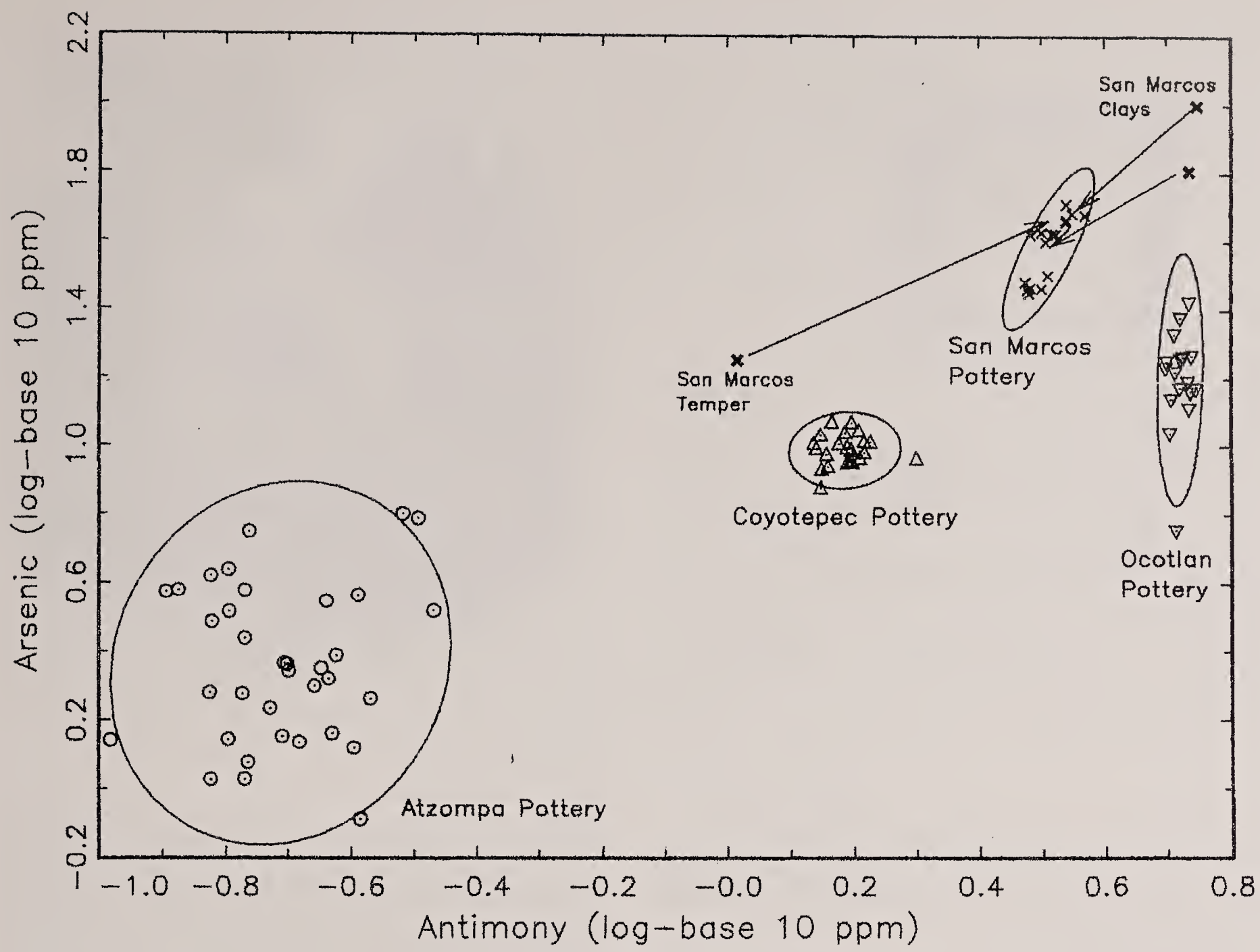


FIG. III.2. Bivariate plot of antimony and arsenic concentrations from four pottery towns in the Valley of Oaxaca.

Projecting from modern kilns, the walls could be calculated as being 40 cm higher than the preserved part. The pottery was placed on a grill or arch formed from seven adobe rectangles, arranged in rays around a cube of fired clay in the center of the kiln. Some of the adobes were wedged against the wall; others rested against vertical columns of adobe (Fig. IV.1).

The fire pit below the grill varied from 55 to 70 cm deep, and there was clear evidence of burning in the center of the kiln, around the door, in the walls, and on the adobes that formed the grill. On the east side, at the base of the fire pit, was a door 55 cm high in the middle, 40 cm wide, made of large stones and rectangular adobes, topped by four rectangular adobes that show evidence of burning on the sides facing into the kiln. Two steps, cut in the bedrock give access to the door. The floor of the firebox was covered with 10 cm of black earth, with evidence of firing, carbon, and burned stones. Above this layer, there was fill of brown earth, stones, and sherds, probably deposited after the kiln was no longer used.

The smaller of the two kilns, feature 71, was conical in shape and was excavated approximately 75 cm into the bedrock. The diameter of the bottom of the kiln was approximately 1.00 to 1.10 m; the top opening, at natural level of the rock, was 80 to 90 cm in diameter. At the northwest side, there was a tunnel forming the access door connecting the interior with the natural slope of the bedrock. The grill, formed of adobe rectangles in horizontal position, was not intact. One horizontal adobe protruded from the wall and was held by another vertical adobe. Fragments of a second in horizontal position were found crushed against the east side of the wall. It appeared that the floor or grill for pottery could have been formed by three or four horizontal adobes, like rays, joined at the center of the kiln. There was evidence of burning on the walls, at the junction of the tunnel with the firebox, and on the adobes forming the grill. The firebox was covered with 15 cm of soil stained with carbon. Above the grill, there was a group of large sherds, including reconstructable vessels, small stones, and sherds. In several cases, fragments of the same vessels showed distinct colors, evidence that they could have been used to cover pottery during firing. Most of the reconstructable vessels were conical bowls, types G-35, K14 (Caso et al., 1967, pp. 385–395, 400, 425), most characteristic of Monte Albán Period IIIB-IV; there were also two ollas, one griddle (*comal*), and one incense burner (*sahumador*). It is probable that these were fired in this kiln and broke in process or perhaps later. If so, they are examples of pottery produced at Monte Albán.

The similarity between the construction of these kilns, particularly the larger, to the modern Atzompa kilns is striking. The particulars include excavation into bedrock, adobe and stone construction, and the design of the grills that hold pottery. Although many modern Atzompa potters

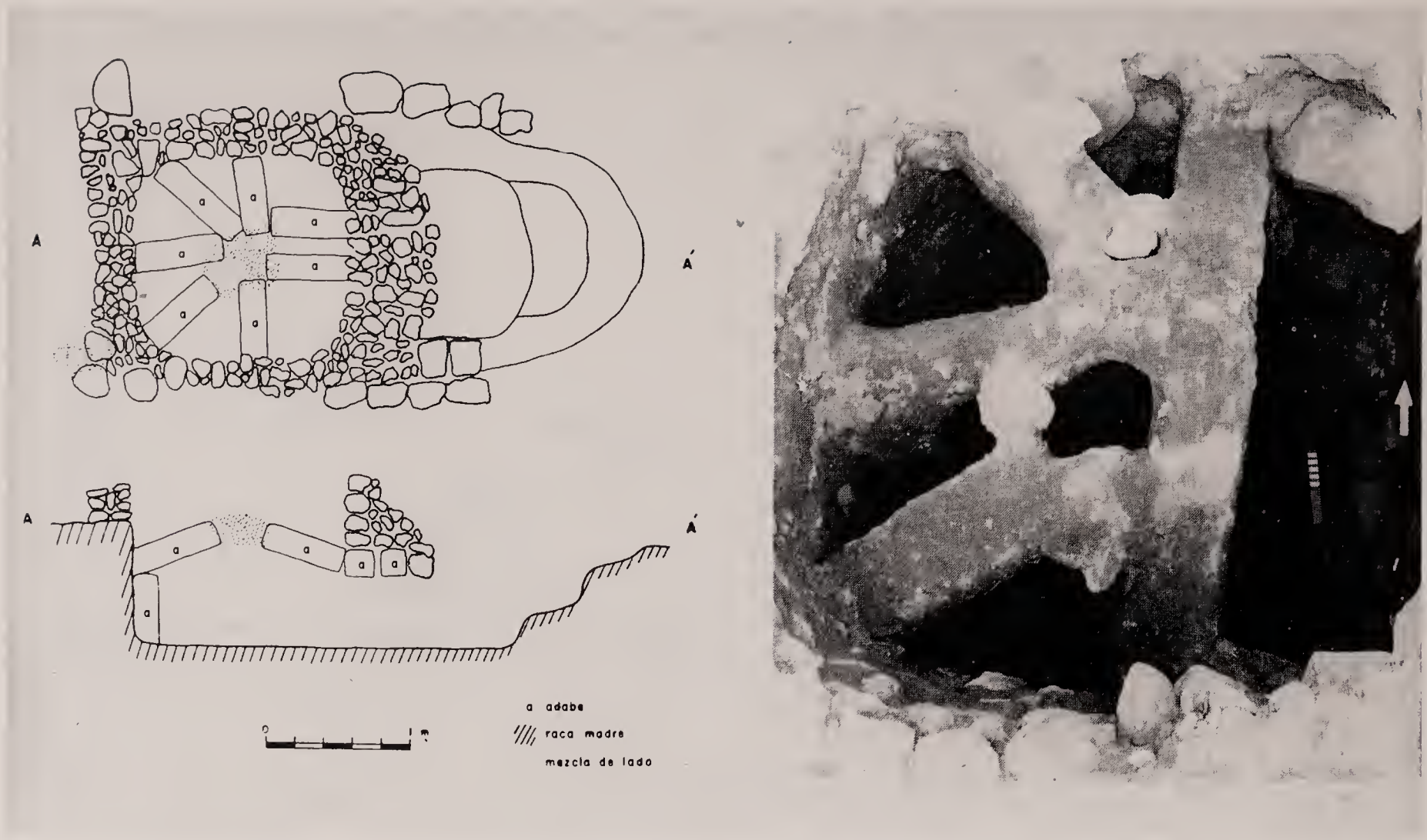


FIG. IV.1. Plan and photograph of grill, feature 5.

construct grills in arch or rectangular designs, some use a spoked-wheel design, including the potters who make large ollas. The size of the fueling door of the larger kiln and the depth of the firebox below the grill level are within the same range as the modern kilns.

The smaller kiln varies from the Atzompa model in its conical shape and depth of excavation. The presence of a tunnel and of substantial numbers of G35 reduction-fired ware suggests that this kiln may have been used for reduction firing.

Two other kilns, also from Monte Albán Period IIIB-IV, located on hills near San Lorenzo Cacaotepec, were excavated in 1981 (Winter & Nardin, 1982). Lomas del Trapiche and Taladro are located in the *municipio* Guadelupe Hidalgo, where it conjoins San Lorenzo Cacaotepec. The excavation was a salvage project conducted in connection with an irrigation trench. Both kilns were partially destroyed by the trenching. Feature 1 had an approximate diameter of 2.4 m. No grill was present, but it was conjectured that a fragment of burned adobes could have been part of a grill, perhaps supported by the burned stones. There were also large sherds that may have been used as kiln coverings. The diameter of Feature 2, deduced from the curve as about 75 cm, was excavated into bedrock and had an opening 15 × 30 cm high, presumably for fueling.

## Appendix V: Residues of Ceramic Production

Residues of ceramic production can be useful to archaeologists as indications that pottery was made at a site. Deal (1988), in his discussion of Chantal pottery, describes archaeological residues of pottery manufacture (Deal, 1988, pp. 70–77), consumption, and depositional units in the household (Deal, 1988, pp. 115–123). A similar approach to residues in Atzompa in the 1990s can be shown. However, although the household is a production unit, it is not significantly a consumption unit. Since pottery production is primarily for sale, very little of the pottery produced in an HPU was in actual use, inasmuch as increasingly metal and plastic utensils and vessels were used for cooking and other households purposes. The depositional material, therefore, is associated primarily with production (Table V.1).

Although little residue remains from San Lorenzo clays, the poorer-quality *laguna* clay must be sieved and the gritty residue tossed on the ground nearby. The gritty residue from the beaten clays is substantially greater and is swept up periodically and heaped in an unused section of the yard. Residues from forming include upturned ollas embedded in the dirt floor, wear on the base of an olla and/or sherd fragment, fragments of revolving platters, and molds. Residues from finishing the pottery include scrapers, polishing stones, cactus spines, nails, and residue of red slip.

Residues from firing include ash and soil modifications. Middleton (1998, p. 135) took temperature measurements and collected soil samples from an Atzompa kiln for chemical analysis. The samples were taken from inside the firing chamber at the surface of the chamber and 5 cm below the surface of the chamber. Since the kilns are built aboveground, and the ash is periodically removed from the firebox, the area around the kiln also contained chemical elements of ash residue although in less concentration than in the kiln area itself (Middleton, 1998, pp. 168, 189–190). Possible also are

TABLE V.1. Residues of ceramic production.

| Function | Location | Residue |
|---|---|---|
| Soaking clay | patio | basin sherds, clay residues |
| Beating and sieving gritty clay | patio | gritty clay residues |
| Forming | shed or house | inverted ollas embedded in dirt floor |
| Forming | shed or house | wear on base of olla or sherd |
| Forming | shed or house | revolving platter fragments, molds |
| Finishing | patio, veranda | scrapers, polishing stones, |
| Finishing | patio, veranda | cactus spines, nails, red slip |
| Firing | patio | kiln ash, soil |
| Firing | patio | kiln sections |

kiln coverings, sherds of *comales* (griddles), and those sherds used as spacers showing evidence of firing that differs from that of whole vessels.

## Appendix VI: Brief Description of Ceramic Methods in Three Other Valley Towns

In the 1990s, in addition to Santa María Atzompa, pottery was being produced in three other towns in the Valley of Oaxaca. I visited each several times and collected samples from the potters for neutron activation analysis at MURR.

San Bartolo Coyotepec is known for the production of reduction-fired black pottery (FMNH 339218; MST SBC 1, 2). According to van de Velde and van de Velde (1939), who studied that ceramic industry in the 1930s, at that time the potters obtained their clay from a pit about 1 m below the surface and about 2 km from the town, a deposit extending about 2 ha that was purchased in 1905, a source that Malinowski and de la Fuente (1982, p. 112) reported to be communal town property in the 1950s. The clay was dried and powdered, then soaked for 24 hours. It was then kneaded with the feet and shaped in cylinders, wrapped, and allowed to stand at least until the vegetable matter had rotted out, perhaps for several months. Rouillion (1952) reported that men fetched the clay from a source at the base of a nearby mountain. Poupeny (1974), writing in the 1970s, placed the source as 11 km from the town at that time; it is possible that the source may have changed over the years. Although Foster (1955, 22) was told that the potters mixed two clays, the van de Veldes (1939) and others all reported only one clay being used, and my informants said the same when I interviewed potters in the course of collecting samples. The raw clay is gray in color but fires buff if oxidized, and we were told that it came from east of the town. Although we were given the small samples that we needed for INAA, the potters reported that the mayor (*presidente*) would not allow clay to be given or sold, and the town has not generally been welcoming to anthropologists who wanted to work there. Forming is done on the revolving platter as in Atzompa (Foster, 1955, 1959); the pottery is then scraped and burnished before being fired in subterranean kilns that are sealed with adobe and mud to create a reducing atmosphere and "smudge" the pottery (van de Velde & van de Velde, 1939, pp. 32–34; Foster, 1955, p. 23). By the 1990s, pottery production in San Bartolo Coyotepec had become primarily a tourist industry, and the pottery was frequently rubbed with graphite to create a shiny black surface. As in Atzompa, pottery production is a family industry with the men digging the clay, women forming the ware, and children participating from an early age.

In Ocotlan de Morelos, Josefina Aguilar uses a fine-grained local clay that is beaten, soaked, and placed on the floor to dry and then kneaded. She presses out "tortillas," then forms small figures, adding pieces for the various appendages. Firing is done in updraft kilns (MST OC 1–5).

The potters of San Marcos Tlapazola combine two types of clay, a black (*barro negro*) and a yellow (*barro amarillo*). Each clay is soaked, then sieved and mixed together with sand. Forming is done on a revolving platter. The finished ware is slipped with a red clay that comes from the mountains above the town (FMNH 339221, 339222, 339223, 339224). Payne (1994, p. 12) described the open firing. First, maguey and cactus leaves were laid on the ground in the patio area, then sherds were piled on the leaves, and then the pottery was piled, and more sherds and more fuel were added. Finally, a ring of ollas would be placed close around the "kiln" pile, gaps filled, and the fuel ignited. Fuel was added to keep the heat even. He recorded a temperature of 700°C in a 53-minute firing.

## Appendix VII: Household Practices of the Sample

| HPU | Clay | Dig/buy | Type of ware | No. of formers | Forming method | Glaze source | Decoration | Firing frequency |
|---|---|---|---|---|---|---|---|---|
| 1 | C2 T2 | dig | green vessels | 1 (2) | kick wheel | co-op/Oaxaca | full glaze, incise | 8 days |
| 2 | C2 T1 | dig | Domestic ollas | 1 | revolving platter, ball-bearing disk | co-op | half glaze | 15 days |
| 3 | C1 T1 | buy C1 dig T1 | *Artesanías* | 2 | revolving platter, hand | Oaxaca | slips, multicolored glaze | 15 days |
| 4 | C1 T1 | buy | Greenware | 1 | revolving platter, kick wheel | co-op | appliqué, incise | irregular with #21 |
| 5 | C2 T1 T3 | dig | Domestic ollas, bowls, etc. | 3 | revolving platter | co-op | half glaze | 15 days |
| 6 | C2 T1 | dig | Domestic ollas | 2 | revolving platter | Oaxaca | half glaze | 15/21 |
| 7 | C2 T1 T2 | dig | Greenware, Domestic, casseroles | 2 | kick wheel, revolving platter | Oaxaca | full glaze | 8 (2 kilns) |
| 8 | C1 | buy | green miniatures | 3 | kick wheel | co-op | full glaze, incise | 8 (2 kilns) |
| 9 | C1 | buy | *Artesanías* | 1 | hand, molds | | red slip, appliqué | irregular |
| 10 | C2 T1 T3 | dig | Domestic casseroles | 3 | revolving platter, | co-op | half, full glaze | 8 (2 kilns) |
| 11 | C2 T1 T2 | dig | green casseroles | 3 | kick wheel, evolving platter | co-op | full glaze | 8 (2 kilns) |
| 12 | C2 T1 | dig | Domestic casseroles, flowerpots | 2 | revolving platter | co-op/Oaxaca | half glaze | irregular |
| 13 | C1C2T1T2 | buy | *Artesanías*, Domestic | 3 | revolving platter, hand, mold | co-op | red slip, appliqué | irregular (2 kilns) |
| 14 | C2 T2 | dig | Domestic griddles | 1 | revolving platter | | | 20 days |
| 15 | C1 T1 | buy | green vessels | 3 | hand | co-op | appliqué | 8 (2 kilns) |
| 16 | C1 C2 T1 | dig C2 T1, buy C1 | Domestic vessels, miniatures | 1 | revolving platter, hand | co-op | half, full glaze | 8 (2 kilns) |
| 17 | C1 T1 | buy | Domestic casseroles | 1 | revolving platter | Oaxaca | full glaze | 15 days |
| 18 | C2 T2 | dig | Domestic casseroles, ollas | 1 (2) | revolving platter | | (half glaze) | with father |
| 19 | C2 T1 | buy | Domestic vessels | 2 | revolving platter | Oaxaca | full glaze | irregular |
| 20 | C1 | buy | *Artesanías* | 1 | hand, molds | | red-slipped ornament | 15 days |
| 21 | C1 T1 | buy | green ashtrays etc. | 2 | hand | co-op (dry) | full glaze | 2 kilns with #4 |
| 22 | C2 T1 | dig | green vessels | 2 | revolving platter | | | sells unfired |
| 23 | C1 | buy | *Artesanías*, miniatures | 2 + | kick wheel, mold, hand | Oaxaca | red-slipped decoration, full glaze | 30 (2 kilns) |
| 24 | C1C2T1 T5 | dig | Domestic large basins, flowerpots | 2 | revolving platter | Oaxaca | half glaze | 15 (2 kilns) |
| 25 | C1 T1 | buy | *Artesanías* | 2 | hand, mold | | | 15 (2 kilns) |
| 26 | C1 T1 | dig | Greenware | 1 | hand | co-op | full | 8 (2 kilns) |
| 27 | C1 | buy | Greenware miniatures | 3 | hand | co-op | full | 20 days |
| 28 | C1 | buy | Greenware miniatures | 1 | kick wheel | co-op | full | 8 (2 kilns) |
| 29 | C1 T1 | buy C1 dig T1 | *Artesanías*, flowerpots | 2 | revolving platter, hand, mold | other HPU | red slip, appliqué | irregular |
| 30 | C2 T1 | dig | Domestic griddles | 1 | revolving platter | | | 8 days |
| 31 | C1 | dig | *Artesanías*, figurines, flowerpots | 3 | hand, revolving platter | co-op | reduction-fired figurines | irregular |
| 32 | C3 T1 | buy | Domestic large basins | 1 | revolving platter, ball-bearing disk | co-op | half glaze | 15 days |

## Appendix VII: *Continued.*

| HPU | Clay | Dig/buy | Type of ware | No. of formers | Forming method | Glaze source | Decoration | Firing frequency |
|---|---|---|---|---|---|---|---|---|
| 33 | C2 T1 | dig | redware | 2 | revolving platter, ball-bearing disk | | full red slip, incise | 15 days |
| 34 | C1 | dig | Greenware vessels | 1 | hand | co-op | full glaze, appliqué | 8 (with #15) |
| 35 | C2 T2 | dig | Domestic jugs | 1 | revolving platter | | half glaze | with #1 |
| 36 | C1 T1 T2 | buy | *Artesanías* | 2 | revolving platter | | other glazes | irregular |
| 37 | C2 T1,2,3 | dig | Domestic, ollas, jugs, flowerpots | 1 | revolving platter | co-op | half glaze | 15 days |
| 38 | C1 T1 | dig | redware | 1 | revolving platter | | full red slip, incise | 15 days |
| 39 | C1 T1 | buy | *Artesanías*, replicas | 2 | hand | | | irregular |
| 40 | C1 T1 T2 | buy C1dig T1,2 | Greenware | 1 | kick wheel | co-op | full, appliqué | 15 days |
| 41 | C1 T1 | buy | *Artesanías* | 1 | revolving platter, hand | | appliqué, other glaze | irregular (2 kilns) |
| 42 | C2 T2 | dig | Domestic casseroles | 2 | revolving platter, ball-bearing disk | co-op | full glaze | 8days |
| 43 | C1 T2 | buy C1 dig T2 | Greenware | 2 | hand | Oaxaca | full glaze | irregular |
| 44 | C1 | buy | *Artesanías*, green | 2 | hand | | | irregular |
| 45 | C1 C2 T1,4 | buy C1, dig C2 T1,4 | Domestic large ollas | 4 | revolving platter | co-op | half glaze | 15, 30 days |

## Appendix VIII: Field Museum of Natural History Collection

| FMNH # | MST # | Type | Clays | Decoration | Surface | Size in inches | Forming method |
|---|---|---|---|---|---|---|---|
| | 1 | figure | C1 (T1) | incised, appliqué | red slip | 9 × 4.75 × 12 | hand |
| | 2 | figure | C1 (T1) | appliqué | glaze | 5 × 2.25 × 9.5 | hand |
| | 3 | figure | C1 | appliqué | red slip | 4 × 2.5 × 5 | hand |
| | 4 | figures (6) | C1 | appliqué | | 2.5 × 2.5 × 2.5 | hand |
| | 5 | figures | C1 | appliqué | | 3.5 × 2 × 4 | hand |
| | 6 | figures (8) | C1 | appliqué | | heights: 2 inches | hand |
| | 7 | figures (4) | C1 | | | 2.75 × 1.5 × 1.75 | |
| | 8 | figures (4) | C1 | | green glaze | 3 × 1.5 × 3.5 | hand |
| | 9 | figures (4) | C1 | | | 3.5 × 1 × 2.75 | |
| 339122 | 10 | figure | C1 (T1?) | appliqué | red-slipped detail | 5 diam., 12.5 high | moldé, hand |
| | 11 | pendant (9) | C1 | appliqué | red slip | 2.25 × 2.25 × .25 | mold, hand decorated |
| 339123 | 12 | pendant | C1 | incised | | 3 × 2.25 × .5 | mold |
| 339124 | 13 | pendant | C1 | appliqué | red slip | 3.25 × 2.75 × .5 | mold, hand decorated |
| 339125 | 14 | pendant | C1 | appliqué | red slip | 4.25 × 3 × .5 | mold, hand decorated |
| 339126.A,B | 15 | box | C1 | appliqué | red slip | 3 × 2 × 1.5 | hand |
| 339127.A,B | 16 | box | C1 | appliqué | red slip | 1.5 diam. × 1.75 | hand |
| 339128 | 17 | figure | C1 | appliqué | red slip | 4 × 3 × .75 | mold, hand decorated |
| 339129.A,B | 18 | box | C1 | appliqué | | 4 diam. × 2.5 | kick wheel, hand |
| 3391230.1,2 | 19 | pendant (2) | C1 | | | 1.5 × 1 × .25 | mold |
| 339131.1–.5 | 20 | figures (5) | C1 | | | .5 × 1 | hand |
| 339132 | 21 | figure | C1 | appliqué | | 1.75 × 1 × .75 | hand |
| 339133 | 22 | figure | C1 | | | 1.25 diam. × .75 | kick wheel, hand |
| 339134.1,2 | 23 | figures | C1 | brown glaze | 1 × 2 × .75 | hand | |
| 339135.1,2 | 24 | figures | C1 | slip | red slip | 2 ×.75 × .75 | hand |
| 339136.1–.3 | 25 | vessels (3) | C1T1 | | brown, blue, yellow glaze | 1.75 diam. × 1.75 | kick wheel |
| 339137.1,2 | 26 | figures (3) | C1 | | | 1.75 × 2 × 3 | hand |
| 339138.1,2 | 27 | figures (2) | C1 | | black | 1.24 × 1.75 × 2 | hand |
| 339139.1–.4 | 28 | vessels (4) | C1? | | green glaze | 1.5 diam. × 1.5 high | hand? |
| 339140 | 29 | hanging | C1 | | glaze | 4.5 × 1.5 × 2 | hand |
| | 30 | figure | C1T1 | appliqué | | 7.5 diam. × 19.5 | moldé, mold, hand |
| 339141 | 31 | candelabra | C1T1 | lilies | | 7 diam. × 3.5 | moldé, hand |
| | 32 | bowl | C2T2? | snakes | | 5.25 diam. × 2 | kick wheel, hand |
| | 33 | apaxtle | C1T4 | | green glaze interior | 8 diam. × 3 | moldé |
| 339142 | 34 | wall hanging | C1T1 | incised, appliqué | 5 × 6 × 2 | mold? | |
| 339143 | 35 | olla | CT2 | appliqué flowers | 4.5 diam. × 3 | kick wheel | |
| 339144.1,2 | 36 | candlesticks | C2T2 | incised, Oaxaca | green glaze | 2.5 diam. × 3.5 | kick wheel |
| 339145 | 37 | incense | ? | | | 5 diam. × 3 | |
| 339146 | 38 | jarro | C1T1 | incised | green glaze | 5 × 7.5 | kick wheel |
| 339147 | 39 | jarro | C2T2 | appliqué flowers | 7 × 6 × 7 | kick wheel? | |
| 339148 | 40 | wall hanging | C2T1 | face incised | 5.25 × 3 × 5 | hand | |
| 339149 | 41 | bank | C1T1 | incised | red slip | 2.75 × 1.5 × 1.75 | mold? |
| 339150 | 42 | hanging | C1T1 | incised | | 6 × 1.5 × 5 | hand |
| | 43 | vase | C1T1 | appliqué | blue glaze-cobalt | 2.5 diam. × 5 | kick wheel? |
| 339151 | 44 | vase | C1T1 | | blue glaze | 2.5 × 3 × 4 | kick wheel? |
| 339152.1–.3 | 45 | chía | C1 (T3?) | incised | some green glaze | 3 × 1 × 2.5 | hand? |
| 339153 | 46 | chía olla | C1T1? | incised, appliqué | red slip | 8 diam. × 6.25 | moldé |
| | 47 | bowl | C1T1 | incised | blue/brown glaze | 14 × 5.5 | moldé |
| 339154.1,2 | 48 | olla de asa (3) | C2T2 | incised, stamped | green glaze | 6 diam. × 7.75 | kick wheel |
| | 49 | jarro | C2T2 | marker stamped | green glaze | 5 diam. × 7.5 | kick wheel |
| | 50 | coffee mug | C2T2 | incised | green glaze | 5.25 × 4 × 4 | kick wheel |
| 339156.1–.3 | 51 | candlesticks (3) | C2T2 | stamped, incised | green glaze | 5 diam. × 6.5 | kick wheel |
| 339157 | 52 | vase | C2T2 | incised | green glaze | 3.5 diam. × 5.25 | kick wheel |
| 339158 | 53 | vase | C1 | appliqué, incised | green glaze | 3.25 diam. × 6 | kick wheel |
| | 54 | vase | C1 | appliqué, incised | green glaze | 3 diam. × 5.75 | kick wheel |
| | 55 | vase | C1 | appliqué | green glaze | 5.5 diam. × 3 | kick wheel?, hand |
| | 56 | vase | C21 | appliqué | green glaze | 4.5 diam. × 2 | hand |
| 339159 | 57 | coffee mug | C1 (T1? T2) | appliqué | green glaze | 5 × 4 × 4.5 | kick wheel |
| 339160 | 58 | vase | C1 | incised | green glaze | 2 diam. × 3 | kick wheel |
| 339161.1,2 | 59 | vase | C1 | | green glaze | 2 diam. × 2.5 | kick wheel |
| 339162 | 60 | jarro | C1 | incised | green glaze | 2 diam. × 2.5 | kick wheel |
| 339163 | 61 | baskets (2) | C1 | | green glaze | 4 diam. × 3 | kick wheel |
| 339164 | 62 | mug | C1 | incised | green glaze | 2 × 1.25 × 1.75 | kick wheel |
| 339165 | 63 | cazuela | C2T1 | | green glaze | 8 × 6 × 2.25 | moldé |
| 339166 | 64 | cazuela | C2T1 | | green glaze | 8 × 6.25 × 3.25 | moldé |

## Appendix VIII: *Continued.*

| FMNH # | MST # | Type | Clays | Decoration | Surface | Size in inches | Forming method |
|---|---|---|---|---|---|---|---|
| 339167.1,2 | 65 | 2 cups | C1 (T1, T2?) | appliqué | green glaze | 5 × 4 × 2.5 | kick wheel |
| 339168 | 66 | dish/ashtray | C1 | incised | green glaze | 5 × 2.5 × 1 | hand |
| 339169.A,B | 67 | teapot | C1 (T1, T2?) | appliqué | green glaze | 8 × 6 × 9.5 | kick wheel |
| 339170 | 68 | toothpick holder | C1 | incised | green glaze | 7.5 × 5.25 × 3 | hand, mold |
| 339171 | 69 | saltcellar | C1 | incised | green glaze | 3 diam. × 3.75 | hand |
| 339172 | 70 | bowl | ? | appliqué, incised | green glaze | 6 × 4.5 × 3 | moldé |
| 339173.A,B | 71 | licorera | C2T2 | appliqué | green glaze | 6 diam. × 9 | kick wheel |
| 339174 | 72 | pitcher | C2T2 | appliqué, incised | green glaze | 6.5 × 4 × 7 | kick wheel |
| 339175 | 73 | bowl | C2T2 | | green glaze | 5 diam. × 2.5 | kick wheel |
| 339176 | 74 | molcajetes (2) | C2T2 | combed interior | green glaze | 7 × 6.5 × 3 | kick wheel |
| 339177 | 75 | vase | C1T2 | | reduced | 3 diam. × 7.25 | kick wheel |
| 339178 | 76 | cantero | C1T2 | | graphite? | 3 diam. × 3.25 | kick wheel |
| 339179 | 77 | cantero | C1T2 | | | 3 diam. × 3.25 | kick wheel |
| 339180 | 78 | cazuela | C2T2 | | | 5.75 × 4.5 × 2 | kick wheel |
| 339181 | 79 | coffee mug | C2T2 | incised | | 5.25 × 4.25 × 4.25 | kick wheel |
| 339182 | 80 | coffee mug | C2T2 | incised | green glaze | 3 × 2.25 × 2.25 | kick wheel |
| 339183 | 81 | molcajete | C2T2 | | green glaze | 4.25 × 3.5 × 1.5 | kick wheel |
| 339184 | 82 | salcera | C2T1 | | green glaze | 4 × 3.25 × 2.5 | moldé |
| 339185 | 83 | salcera | C2T2 | incised | multicolor glaze | 4 × 3.5 × 3.5 | moldé |
| 339186 | 84 | pitcher | C2T2? | appliqué | multicolor | 5 × 3.5 × 4.5 | moldé/kick wheel? |
| 339187 | 85 | cup | C2T2 | appliqué | green glaze | 3.25 × 2.5 × 1 | kick wheel |
| 339188 | 86 | cazuela | C1T1 | incised, fluted rim | green glaze | 6.75 × 5.25 × 2 | moldé |
| 339189 | 87 | cazuela | C2T1T2 | pinched rim | green glaze | 6.75 × 5 × 5 × 2 | kick wheel |
| 339190.1–.3 | 88 | cazuelas (3) | C2T1T3 | pinched rims | green glaze | 13.5 × 11.5 | moldé |
| 339191 | 89 | cazuela | C2T1T3 | pinched rim | green glaze | 10.5 × 8.5 × 4 | moldé |
| 339192 | 90 | cazuela | C2T1T3 | | | 9.25 × 8.25 × 3.25 | moldé |
| 339193 | 91 | olla | C1C2?T1 | green glaze | 3 diam. × 2.5 | moldé | |
| 339194 | 92 | olla | C2T1 | | green glaze | 7.5 diam. × 6.5 high | moldé |
| 339195 | 93 | olla | C2T1T3 | | green glaze | 6.5 × 5.25 | moldé |
| 339196 | 94 | olla estufa | C2T1T3 | | | 7 × 5 × 4.5 | moldé |
| 339197 | 95 | olla estufa | C2T1T3 | | green glaze | 10 × 8 × 7 | moldé |
| | 96 | jarro | C2T2 | appliqué | | 7.5 × 7 × 7 | kick wheel |
| | 97 | coffee mug | C2T2 | appliqué | multiglaze | 5 × 3.5 × 3.75 | kick wheel |
| 339198 | 98 | bowl | C2T1T3 | | glaze | 5 × 2.25 | moldé? |
| 339199 | 99 | bowl | ? T3 | pressed rim | glaze | 5.25 diam. × 2.5 | moldé |
| 339200 | 100 | vase (barelito) | C1T1 or T5 | incised, cut out | multiglaze | 6 diam. × 7 | moldé |
| | 101 | barillo | C1, T1,or T5 | incised | multiglaze | 9.5 diam. × 19 | moldé |
| 339201 | 102 | figure | C1 T1 | | green glaze | 3.5 × 1.25 × 2.5 | hand |
| 339202 | 103 | figure | C1 T1 | | blue glaze | 2.5 × 2 × 2 | hand |
| | 104 | candelabra | C1 | appliqué | red slip | 10.5 × 8 × 10 | hand |
| | 105 | figure | C1 T1 | appliqué | | 16 × 14 × 24 | moldé, mold, hand |
| | 106 | dish | C1T1 | incised | | 8 × 4.5 × 1.5 | moldé |
| | 107 | ashtray | C1 | incised | blue glaze | 4 diam. × 1.25 | hand |
| | 108 | ashtray | C1 | incised | blue glaze | 3.25 diam. × 1 | hand |
| 339203.1–.4 | 109 | 4 miniatures | C1 | | green glaze | 2 diam. | hand |
| 339204.1–.5 | 110 | juguetes (5) | C1 | | green glaze | 1 diam. × 2 | hand |
| 339205.1–.7 | 111 | juguetes (7) | C1 | | green glaze | 1.5 × 1.5± | hand |
| | 112 | barrillo with lid | C2T1 | incised flowers | red slip | 9.5 diam. × 7 | moldé |
| 339206.A,B | 113 | barrillo with lid | C2T1 | incised flowers | red slip | 10.5 diam. × 13 | moldé |
| 339207.A,B | 114 | barrillo with lid | C2T1 | incised flowers | red slip | 9 diam. × 10.5 | moldé |
| 339208, 329209 | 115 | vessel (dibore) | C1T1 | appliqué | red slip | 11 diam. × 19 | moldé |
| | 116 | vessel (dibore) | C1T1 | appliqué | red slip | 11 × 15 | moldé |
| | 117 | vessel (dibore) | C1T1 | appliqué | | 10.5 diam. × 16 | moldé |
| | 118 | olla | C2T1 | | green glaze | 12.5 diam. × 11.5 | moldé |
| 329210 | 119 | pichancha | C2T1 | | green glaze | 13 × 11 | moldé |
| | 120 | box with lid | C1 | appliqué | red slip | 2 diam. × 1.5 | kick wheel |
| | 121 | figures (earrings) | C1 | appliqué | | 1.4 × .5 × 1.75 | hand |
| 339211.1,2 | 122 | comal (griddle) | C2T1 | | | 14 diam. × .5 | moldé |
| | 123 | comal | C2T1 | | | 11 × .5 | moldé |
| | 124 | pendant | C1 | incised | | 1 diam. × .5 | hand |
| 339212 | 125 | whistle | | | green glaze | 1.75 × 1 × 2.5 | hand |
| 339213 | 126 | napkin holder | C1 | incised | green glaze | 3.5 × 2 × 3.5 | mold |
| | 127 | urn | C1T1 | appliqué | red slip | 10.5 × 8 × 9 | moldé |
| | 128 | vase | C1T1 | incised | multiglaze | 8 diam. × 11.5 | moldé |
| | 129 | vase | C2T1 | incised, cutwork | multiglaze | 8 diam. × 10.5 | moldé |
| 339214 | 130 | figure | C1? | incised | | .75 × .75 × 2.5 | hand |
| 339215 | 131 | flowerpot/olla | C2T1 | | | 15 diam. × 14.5 | moldé |
| 339216.1,2 | 132 | flowerpots (2) | C2T1 | fluted | green glaze | 9 diam. × 5 | moldé |
| | 133 | flowerpot ("jardinera") | C2T1 | fluted | green glaze | 9.5 × 8.5 × 8 | moldé/hand |

## Appendix VIII: *Continued.*

| FMNH # | MST # | Type | Clays | Decoration | Surface | Size in inches | Forming method |
|---|---|---|---|---|---|---|---|
| | 134 | flowerpot | C1T1 | animal figures | red slip | 16.5 × 12 × 6.5 | moldé/hand |
| FMNH Ed Dept. | 135 | flowerpot | C1T1 | animal figures | red slip | 12 × 11.5 × 13 | moldé/hand |
| | 136 | flowerpot | C1T1 | incised | multiglaze | 11 diam. × 7.75 | moldé |
| | 137 | flowerpot ("jardinera") | C2T1 | incised | multiglaze | 6 × 5 × 4.5 | moldé |
| 339217 | 138 | flowerpot | C2T1 | | green glaze | 6 × 4.5 × 3.25 | moldé |

## Appendix IX: Glossary

*Almud* Measure of area equaling about 0.0578 ha; also the amount of corn obtained from that much land. It is used as both a measure of volume and a basis of land measurement, that is, the amount of land that can be sown with an almud of seed

*Apaxtle* Pottery basin

*Arco* Arches separating the firebox in the kiln from the chamber where the pots are stacked

*Artesanías* Decorative ware

*Atole* Drink made from corn

*Barrillo* Tall pottery jar used for storing water

*Barro* Clay

*Barro áspero* Gritty clay used as temper

*Basura* Trash, including grass or weeds, used as fuel in the kiln

Birefringence Geologic term: The decomposition of a ray of light into two rays, characteristic of many minerals when observed under polarized light with a petrographic microscope

*Bordado* Appliquéd decoration

*Cántaro* Globular jar used for carrying water

*Cazuela* Pottery casserole dish

*Chía* Striated pot planted with seeds at Easter

*Chimolero* Mortar in shape of a pig for preparing food

Clast Geologic term: fragment from a broken larger rock

*Comal* Flat clay griddle for baking tortillas

*Compadre* Man in a system of ritualized friendship, such as a godparent

*Crema* Buff colored pottery

Deuteric Geologic term referring to minerals formed as water-rich solutions, circulated around magma at a late stage in cooling history

*Grande* Large

*Greta* Term used for lead oxide glaze material

*Gringo* North American, person from the United States

*Gris* Gray, grayware

*Gris cremosa* Gray pottery with white feldspathic flecks

*Horno* Oven or kiln

*Hornillo* Sagger

*Jardinero* Flowerpot

*Jarro* Jug

*Juguete* Literally a toy, refers to a miniature vessel

*Kabal* *Moldé* or revolving platter

*Laguna* Literally pond, refers to a clay source in the Atzompa *municipio*

*Lamina* Sheet of corrugated metal

Levigation Mixing water with clay to allow heavier particles to settle and leave finer material in suspension

*Licenciado* University graduate

*Mercado* Market

*Molcajete* Mortar, bowl with combed based for preparing food

*Moldé* Revolving platter or circular turntable used as a base in forming pottery

*Municipio* Municipality, equivalent to a county in the United States or a township in New England

*Musico* Figure of an animal playing a musical instrument

Olla Globular shaped jar with a wide mouth

*Olla de asa* Globular jar with a handle over the top

*Olla estufa* Globular jar with a flat bottom designed to set on a gas or electric stove

*Oficio* Occupation or craft; used in Atzompa to refer to the type of pottery made by a family or an individual

*Pichancha* Olla with holes, used in the processing of maize and by potters to hold miniatures during firing

*Plaza* Street market

*Plomo* Lead

*Presidente* Mayor, first in authority in the municipal council

*Posada* Christmas event

*Regatón* Merchant or middleman; here used specifically for merchants who buy pottery for resale

*Torno* Kick wheel

*Tornillo* Ball-bearing disk set on cement pedestal support a revolving platter

*Verde* Green; in referring to pottery, glazed green

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